The Mining Journal

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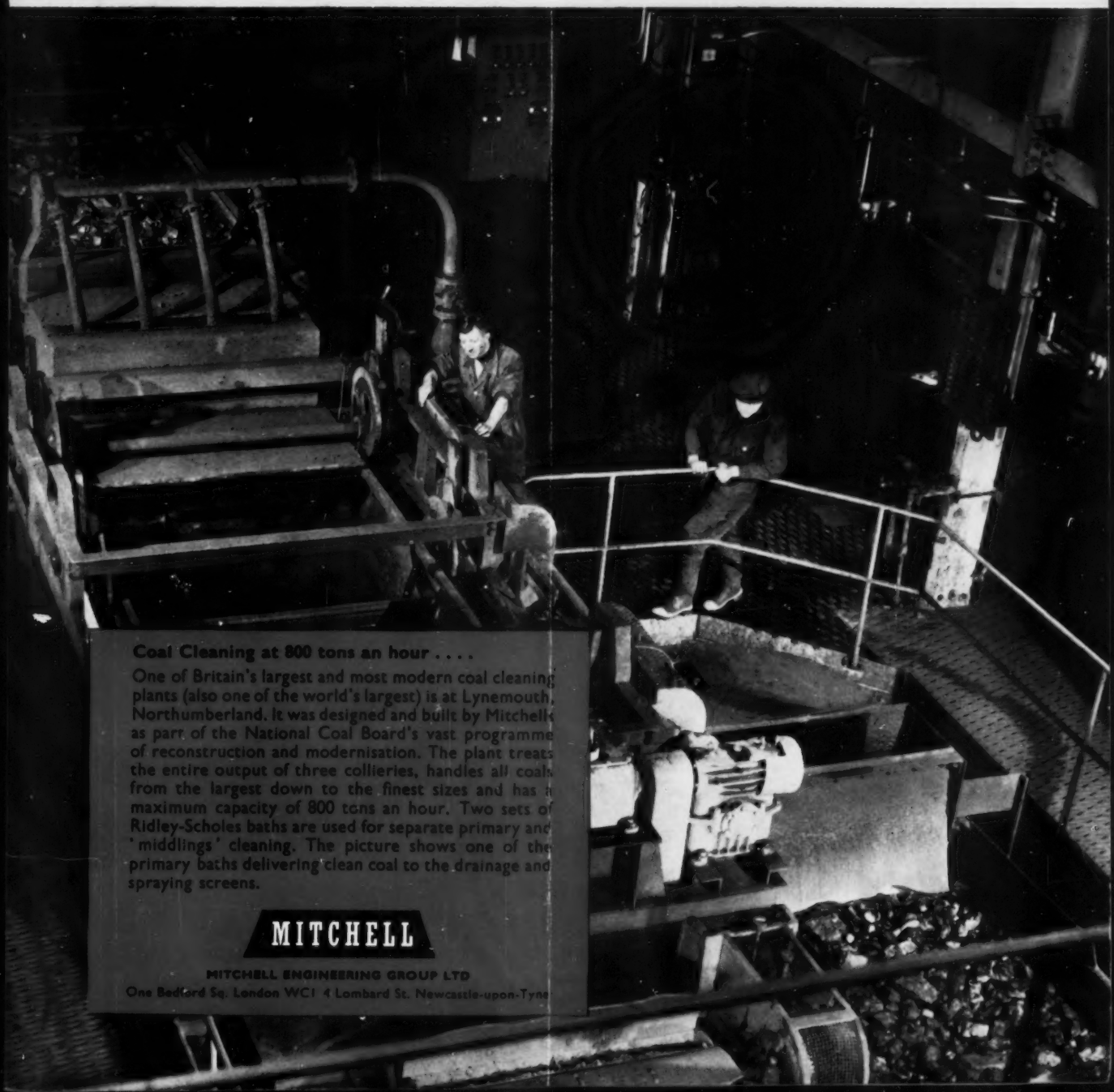

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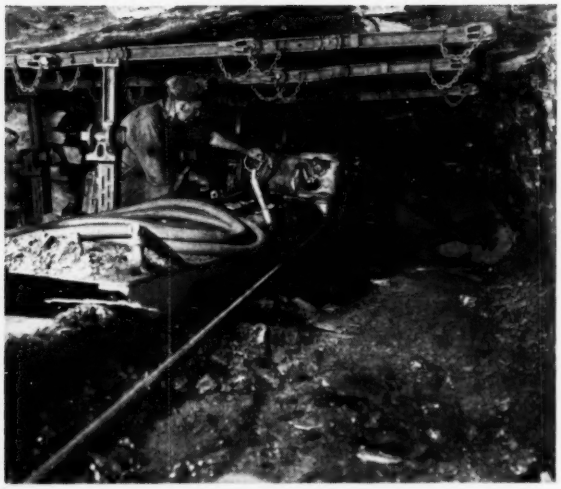

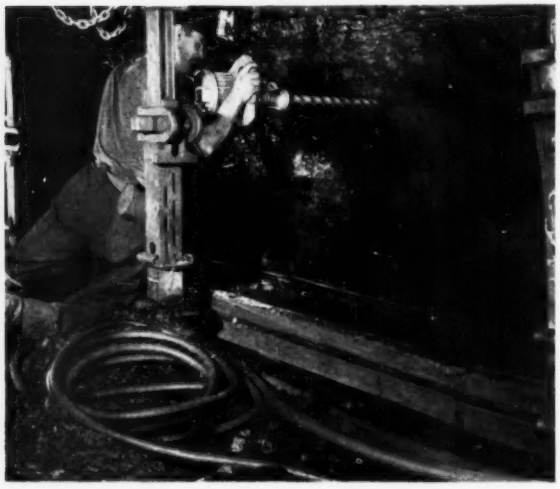

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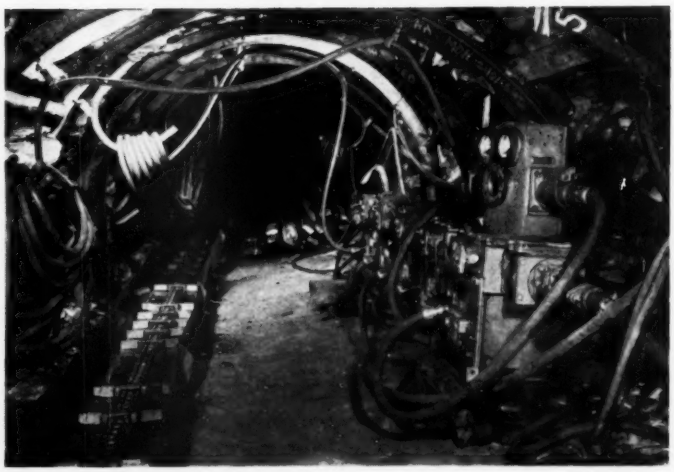

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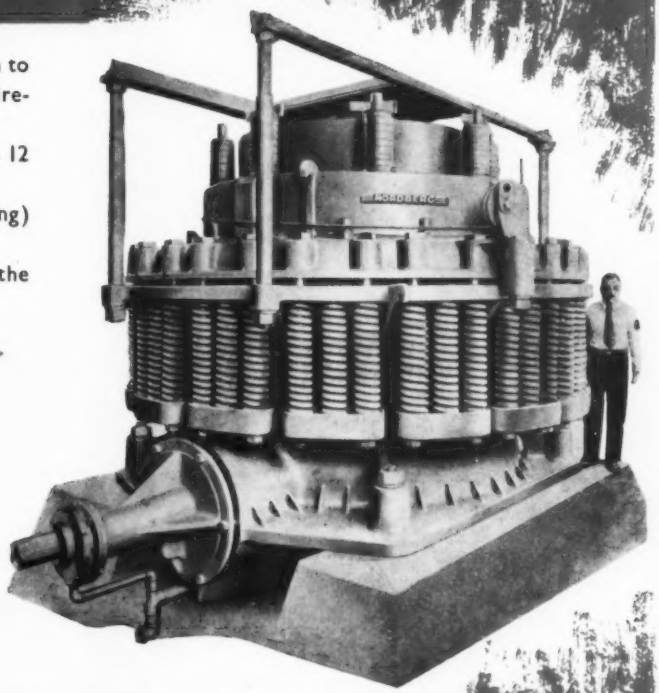

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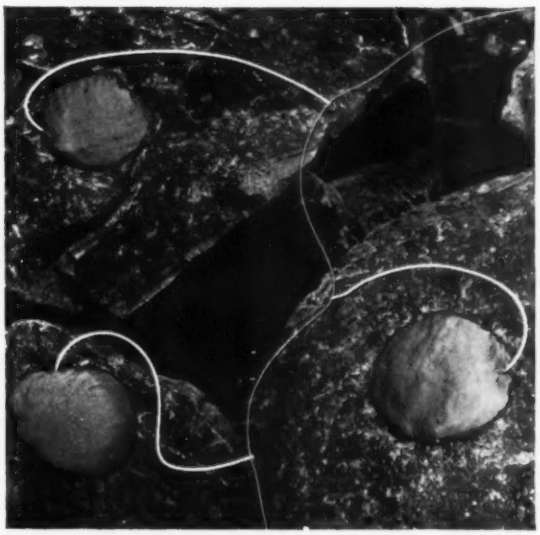

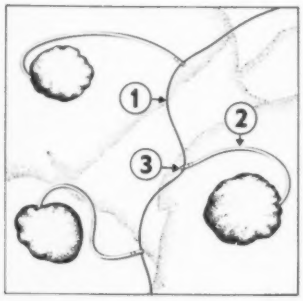

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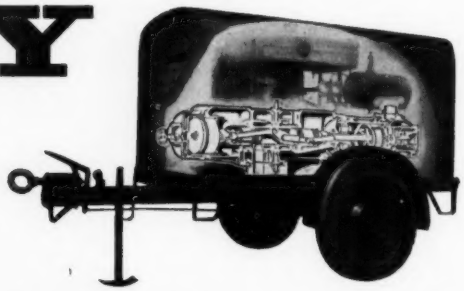

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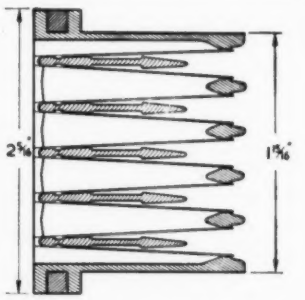

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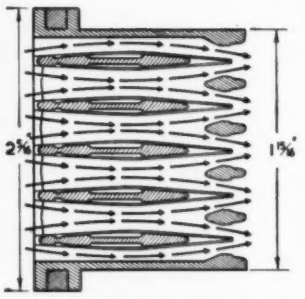

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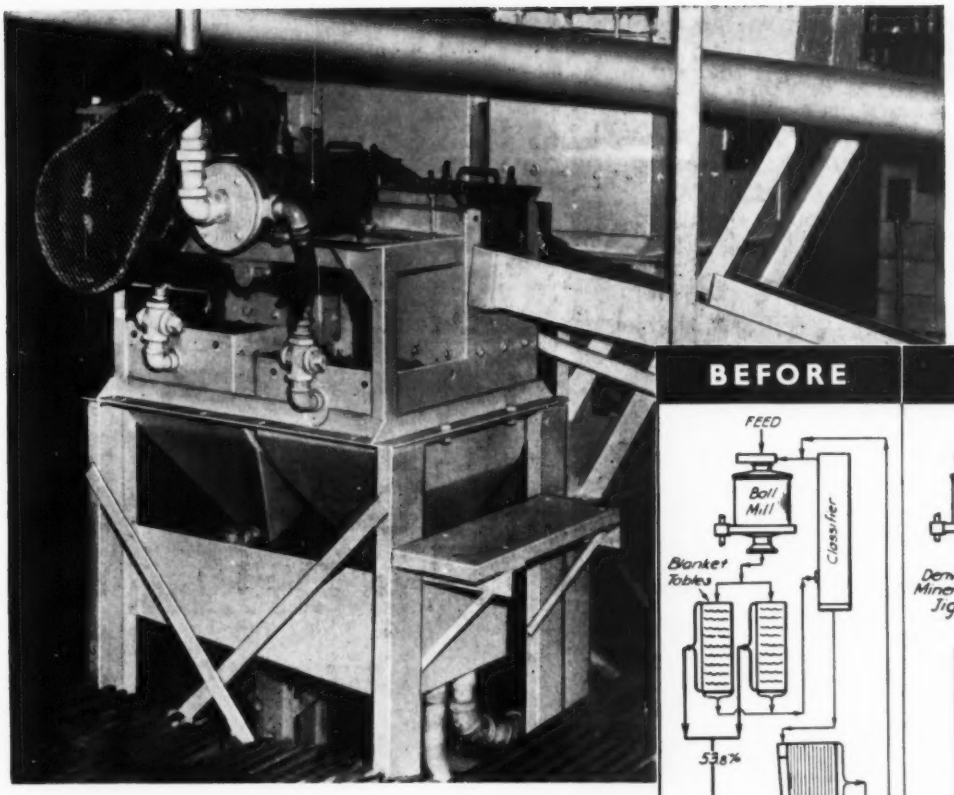

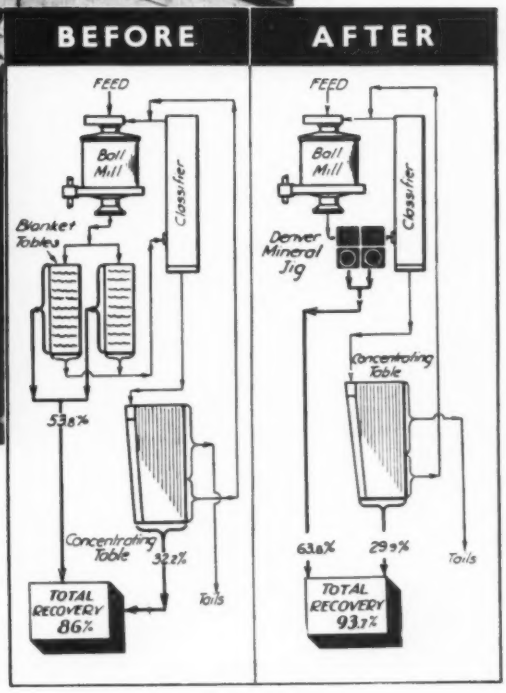

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The Mining Journal

London, November 30, 1956

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Joint Editors
U. Baliol Scott R. Bruce Dunfield

News Editor A. G. Thomson
Financial Editor I. M. Moseley

Assistant Editor
R. Bowran

Display Advertisement Manager
E. S. Hooper

Circulation
Robert Budd

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Will Rutile Boil Over?

NEW uses and new processes have led to a rapidly growing demand for the titanium minerals, rutile and ilmenite, and also for zircon. Australia is now the world's leading producer of rutile and zircon concentrates and its east coast beaches are the world's richest known sources of these minerals. Judging from reports of actual and forecast profits, Australia's sands are truly golden—in value, if not in colour.

Production and exports of Australian rutile concentrates rose from approximately 14,000 tons in 1948 to 59,686 tons in 1955. The record total of 37,206 tons was established in the first six months of 1956 and production in the current half-year period is expected to be substantially higher. The forecast production of 80,000 tons for the year seems assured and could well be exceeded. So far, expansion has been mainly from established producers, but before the end of 1956 several new plants will be in operation and the capacity of the industry will be further increased.

Is the world market insatiable enough to absorb the rapidly swelling flow of rutile from Australia, bearing in mind that the production of ilmenite in India, Norway and elsewhere is also expanding and that Canada has become a large producer of titanium ores? In the London market prices of Australian rutile have lately been drifting downwards. Demand has slackened considerably and it is believed that many users are covered for some time ahead.

Is this decline a temporary trend, aggravated perhaps by the belief that a third release of rutile from the U.K. government strategic stockpile is imminent? Or is it a warning signal that Australian producers would do well to heed? Experience in more than one Commonwealth industry—the slump in Rhodesian tobacco some thirty years ago is a good example—shows that too many cooks can pickle even the most golden goose.

We are not among the pessimists, believing that in the long term the world will want all the rutile that Australia can supply. High profits, however, tend to cause temporary over-production. The process of readjustment is apt to be painful and costly, particularly for the shareholders of the companies concerned.

That this danger is not being overlooked in Australia itself is indicated by an assessment of the world market for rutile, which appears in the current issue of the quarterly publication, *Australian Mineral Industry* (Vol. 9, No. 2).

The survey points out that in the U.S. commercial production of titanium metal has risen from three tons in 1948 to an estimated 10,500 tons in 1956. It is reported that by the end of this year installed capacity will be 22,000 tons of metal, rising to 26,500 tons late in 1957. Thus, should capacity production be achieved by the end of 1957 and assuming that the only raw material used is rutile, consumption of that mineral for metal production would be at the rate of 57,000 tons annually.

Consumption of rutile in welding rod coatings, alloys and carbides, and ceramics in the U.S. does not exceed 20,000 tons. It is possible that the recent high prices for rutile may have caused a swing away from rutile to a greater use of ilmenite, particularly in welding rods, and the estimate of 20,000 tons could be high.

At best, therefore, the consumption of rutile in the U.S. by the end of 1957 cannot be expected to exceed 75,000 tons. This pre-supposes that ilmenite and titanium-rich slags will not be used as raw materials for metal production. Little information is available as to developments in the use of alternative raw materials, but it seems likely that rutile will continue as the basis for the bulk of the metal industry for at least the next two or three years. In the long term, however, the titanium metal industry will almost certainly be based on ilmenite and titaniferous iron ores.

It has also to be borne in mind that domestic production of rutile in the U.S. is rising and from recent reports might well exceed 10,000 tons by the end of 1957. Thus the maximum imports for current usage under optimum metal-production conditions would be of the order of 65,000 tons. One of the largest consumers is developing a Mexican hard-rock rutile deposit; it was proposed to work this at the rate of 24,000 tons of concentrates annually, but recent reports indicate that the grade of ore is considerably below original published statements. However, it could well be that the U.S. intake other than Mexican will not be higher than about 40,000 tons by the end of 1957.

Outside of the U.S., Britain has been the largest individual purchaser of Australian rutile. Present U.K. requirements for metal production are about 3,500 tons annually. There appears little probability of requirements for all uses in the U.K. rising above 12,500-15,000 tons in the immediate future.

The increase in rutile exports to other countries, principally in Western Europe, has been spectacular. There is little activity for the present in the metal industry in these countries. Japanese capacity is expected to rise shortly to 2,000 tons, but is based on other raw materials. Hence it can only be assumed that much of the upsurge in demand from these countries is due to the increase in general industrial activity. There is, of course, the possibility that some rutile is being re-exported from Western Europe to Russia, where a large-scale metal industry is reported to be operative.

In estimating the demand for Australian rutile the possibility of new supplies from other sources is pertinent. Apart from increased production in the United States and the opening up of the Mexican deposit previously mentioned, recent reports indicate that supplies may also be forthcoming from West Africa in the not-distant future.

Taking all these factors into account, it is considered possible that world requirements of rutile within the next two to three years might rise to 120,000 tons annually, of which not more than 85,000 to 95,000 tons would be required from Australia. These estimates assume that the full proposed metal production capacity will be in operation, that rutile will continue as the basic raw material of metal production, and that buyer resistance does not bring about a change in the consumption pattern in the more conventional markets.

It is accordingly concluded that prices may continue to fall if further planned increases in production materialize. Those contemplating entering into the rutile production industry are advised to take stock of the market over the next two or three years before proceeding with their plans.

One obstacle limiting Australian exports of both rutile and zircon may be the difficulty of finding sufficient cargo space. Present shipping facilities are not capable of handling all tonnages offered for shipment from Brisbane to the east coast of America. Australian mineral producers have made strong representations to the shipping companies concerned and are seeking the support of both the Australian and U.S. governments.

INCENTIVES FOR POLISH MINERS

Among the first problems to engage the attention of Poland's new government is the urgent necessity for raising the productivity of miners and industrial workers.

Addressing a Plenum of the Polish United Workers' Party on October 22, Mr. Wladyslaw Gomulka emphasized that only by producing more, more cheaply, and better, could standards of living of the working class and, indeed, of the whole nation be increased. This, he said, was the crux of the problem of workers' self-government currently under discussion by the workers in factories and by various Party and State organs. He suggested that exhaustive research should be carried out to decide whether, for example, in the coal industry it was possible to apply greater material incentives strictly linked with an increase in the extraction of coal.

Examining the achievements of the Six-Year Plan in coal mining, Mr. Gomulka said that in 1949 coal production in Poland amounted to over 74,000,000 tons. In 1955—that is, in the last year of the Six-Year Plan — the corresponding figure was 94,500,000 tons. As he pointed out, this would give cause for considerable satisfaction had the higher output been attained by increasing the productive capacity of the mining industry. Statistical data revealed, however, that the miners worked 92,634,000 hours overtime in 1955 and that this constituted 15.5 per cent of the total number of hours worked in that year. Calculated in terms of coal, this amounted to 14,600,000 tons of coal extracted outside normal working hours.

Mr. Gomulka went on to show that in 1949 coal output per working day per worker throughout the industry amounted to 1,328 kgms. In 1955 it fell by 12.4 per cent to 1,163 kgms. A similar comparison of coal output per worker employed underground showed a drop equivalent to 7.7 per cent per working day. In 1955 output per working day per person employed in the mining industry was 36 per cent lower than in 1938.

These figures suggest that, despite the emphasis placed by the Soviet Authorities on research and modernization, the expansion of mining in the Satellite countries—possibly to some extent within the U.S.S.R. itself—may have been due less to improved technology and organization than to sheer increase in the volume of manpower employed and the number of man-hours worked.

In discussing what form material incentives for miners might take Mr. Gomulka said that each colliery had its period plan of coal extraction, worked out while taking into account the concrete conditions of the given colliery and based on the present productivity. The planned tasks of the various collieries should not be lower than the actual coal extraction in the previous year, provided there were no essential changes in work conditions. Such a plan should be worked out by the management of the collieries in association with workers' representatives.

Material incentives for the workers, it was suggested, might arise from over-fulfilment of the plan. Every ton of coal extracted above the plan should be suitably divided between the workers of the given colliery and the State as the colliery's administrator. Should productivity be brought with the assistance of such a system to the level of 1949, grants to workers in the form of a coal allowance of a certain percentage of the coal extracted over-plan might amount, for example, to an average of 15 tons of coal annually per miner worth some $300, calculating the value in terms of the export price. Presumably workers could draw their incentives in cash instead of coal.

An incentive scheme broadly on these lines appears to be admirably suited to the requirements of a country whose paramount need is to raise the productivity of miners and

industrial workers with the utmost possible speed in order that no time may be lost in eliminating economic hardships which cannot be abolished merely by a change in the system of government, however welcome. At the same time is should be realized that when prosperity returns to Poland—as it most surely will—incentives will not necessarily ensure industrial peace. We have in mind the example of Australia, where much has been done in the way of bonus payments to employees. All was well while prosperity remained on the up-grade, but some Australian concerns are now finding that set-backs are liable to result in trouble. For instance, a tin company in Tasmania established a Prosperity Bonus, the basis being the payment of £1 per week for each 3d. paid in quarterly dividend, over and above normal wages due under Awards and Contracts. The company had recently to reduce the quarterly dividend from 1s. to 9d. per share, involving a reduction in the Prosperity Bonus from £A4 to £A3 per week. Employees have refused to accept the reduction and are now on strike.

It may well be that Polish workers will display a more responsible attitude towards the reversals of fortune which will inevitably be experienced from time to time in the years to come. Meanwhile, if an incentive system can hasten Poland's return to prosperity its introduction must be regarded as well worthwhile.

AND THEN THERE WERE THREE

The melancholy saga of New Zealand's declining metal mining industry is carried a stage further by the Mines Statement for the year ended December 31, 1955. Gold production fell last year by a further 15,270 oz. to a mere 26,443 oz.—little more than a third of the 1950 output, which amounted to 76,527 oz.

At the beginning of the year four dredges were in operation, but early in 1955 the small Rainbow dredge in Otago ceased operations, and then there were only three. However, work was continued on the erection of the Kaniere dredge at the Taramakau River, which was expected to be in operation by the middle of 1956.

There was little change in the position of alluvial gold mining, but during the year the Round Hill Gold Mining Co. Ltd. ceased operations. Alluvial production is now dependent on the activities of one company and the intermittent operations of a few small parties.

No prospecting operations of any consequence in any section of the industry were undertaken during the year, and it is becoming increasingly apparent that future gold production, for all practical purposes, will be confined to the operations of three dredges, two in the West Coast and one in Otago.

During 1955, 27,930 oz. of silver, valued at £8,249, were produced, almost all of it due to cleaning operations at the Martha treatment plant.

No copper ore was mined last year, the only activity being the completion of a diamond-drilling programme at Kawau Island. Small tonnages of iron ore, magnesite, manganese, scheelite and diatomite were again produced. Work was resumed at an asbestos mine in the Upper Takaka Valley, from which 154 tons of fibre were recovered.

The Mines Department has completed its investigation of a pyrite deposit in the Kauaeranga Valley near Thames. While large tonnages of pyrite-bearing material were indicated, the grade proved too low to constitute a deposit which under present conditions could be exploited economically for its sulphur content.

The discovery of radioactive material at Batty Creek in the Buller Gorge caused considerable excitement and resulted in applications for mining privileges over much of the surrounding area. Surface sampling indicates that most of the material has a low uranium content, but much of the outcrop shows signs of leaching. So far the uranium-bearing minerals have not been positively identified and no serious testing of the lode has been undertaken. An area on the north side of the Buller River, directly opposite the original discovery, has shown the existence of large float boulders which are much more strongly reactive and which show a high uranium content by assay. As yet, no deposit of any magnitude has been located, but this area is regarded as a most interesting prospecting venture.

Some interest was aroused by the discovery of radioactive minerals in the vicinity of the Haast River in South Westland. Chemical analysis showed that the radioactive properties were due to the presence of thorium and the mineral was identified as thorite. Up to the present only float boulders of the material have been located.

MINING IN THE FRENCH UNION

A technical report, prepared by the Chamber of Colonial Mines, has disclosed details of forthcoming developments in French overseas territories in various branches of mining.

A consortium of French, British, Italian and German interests is to build an 85 kilometre cable railway, claimed to be the second longest in the world, to carry manganese ore from the Moanda-Franceville deposits in French Equitorial Africa, to a railhead from where it will be carried to Pointe-Noire on the Atlantic coast. The cable railway will have an initial carrying capacity of 150 tons an hour which will be doubled later when mining is in full swing. The deposits—said to be second only in importance to those at Nikopol in the Soviet Union—are being exploited by the Companie Minière de l'Ogoue (Camilog) in which U.S. steel has a 49 per cent interest.

The report indicates that Camilog expects to complete planning this year for the commercial exploitation of the manganese deposit on the Okoumazoungou Plateau. The company has also completed the examination of the Bamgombe Plateau deposits and has been running semi-industrial extraction operations.

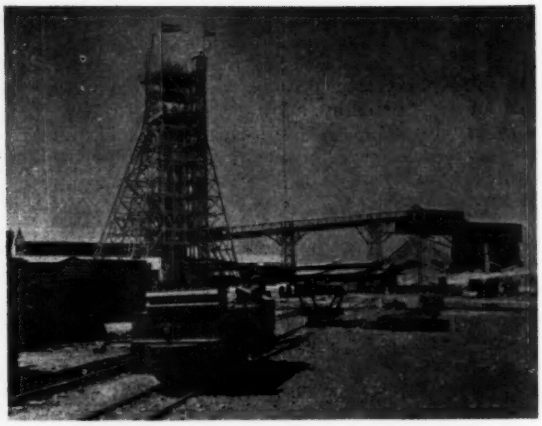
Sté. des Mines de Cuivre de Mauritanie expects to finish its prospecting work this year. It is anticipated that a decision on the exploitation of the Guelb Moghrein deposits will be made shortly. Experimental treatment of these sulphur-bearing minerals is understood to have resulted in the development of a satisfactory concentrating procedure. Proved reserves are put at 18,000,000 tonnes of 1.5 per cent sulphur-bearing mineral and 9,000,000 tonnes of 2.5 per cent oxidized mineral.

Sté. Miniere Gaziello is exporting the major part of its ilmenite production from Djifère, French West Africa, to France. Output, which reached 27,600 tonnes in 1955, is expanding at a rate of 50 per cent annually. In the Cameroons, it is anticipated that the Edea project could, as a by-product, turn out some 300 tonnes annually of ferro-titanium.

Sté. Les Etains du Cameroun is continuing to prospect for cassiterite deposits. In Fernch West Africa, Sté. Minière du Dahomey-Niger is carrying out further prospecting for cassiterite, while operating its own mine.

The company Le Nickel is studying plans for a cobalt flotation plant in New Caledonia. Pilot plant trials have been undertaken.

Merriespruit Poses the O.F.S. Water Problem



No. 1 Shaft at Merriespruit

THE major mining news of the last month and that which may have important implications for the whole of the gold mining industry has been the heavy inrush of water at Merriespruit G.M. which put the mine completely out of production. How long it will be before anything like normal operations can be resumed is, at present, anybody's guess.

The presence of large bodies of water underground in the Free State, which on the surface is dry, has been known virtually from the start of mining operations.

The Harmony-Virginia-Merriespruit area is largely isolated from the rest of the Free State field by a fault running roughly on a line north to south, but early on there were indications that appreciable amounts of water existed in it. It will be recalled that water was one of the reasons for Virginia not undertaking major development work from its No. 3 shaft. In the course of drilling on Merriespruit, certain boreholes struck water under pressure and developed into artesian wells. Shortly after production started at Merriespruit, it became obvious that the mine was making more water than the two other properties in the area. All precautions were immediately taken to cope with this and technical discussions held with cementation authorities.

During September, the latter informed that the fissures in the mine were much greater than anything yet encountered in any mine in the country, and advised a policy of exercising the greatest caution in development in any area where water had been met. Towards the end of the month steps were taken to increase the pumping capacity of the mine to 10,000,000 galls. a day. At that time, the actual amount handled was about 2,000,000 galls. a day. Coupled with this, the water storage capacity of the mine was given attention. By installing water doors and safeguarding the pump station at the bottom of No. 1 shaft, it was possible to store 15,000,000 galls. in the eastern portion of the mine. The first serious inrush of water happened on September 14, when about 60,000 galls. an hour broke through on level 31 after a fall of hanging. The pump chamber was protected from the floodwaters by storing about 4,000,000 galls. in the eastern portion of the mine. A concrete wall was built to seal this off and the water pumped through the normal channels.

On October 2 a wide fissure in 31 haulage east, which had been sealed off, started to leak at a rate of 2,000 galls. an hour and increased to 30,000 galls. per hour by October 5. Assisted by the Cementation Company, an attempt was made to seal off the fissure to obviate the installation of a concrete plug. The pumps were able to handle the inflow comfortably. Cementation, however, did not succeed and on October 17 it was decided to instal a concrete plug, which it was hoped to have completed by October 20. (This plug was in the haulage.)

On October 19, a further inrush developed in 31 crosscut south at the intersection of the shale hanging wall and the quartzite footwall, adding a further flow of 600,000 galls. a day. This new fissure, like the original, opened up with a fall of hanging. A further inrush in the ore pass system flowed down the shaft and flooded the pump station on 35 level.

Between October 22 and 29, water was entering the mine at a rate of some 7,000,000 galls. a day. There was still a possibility just after October 20 that the mine could be saved as pumping equipment was arriving from other Free State mines to assist the overloaded pumps *in situ*. Once the latter were lost, it became obvious that concrete plugs would have to be installed in the No. 1 and No. 2 shafts.

In this article our South African correspondent recalls the water inrushes suffered recently at Merriespruit G.M., and offers a theoretical solution.

These were duly installed between levels 31 and 33. The total weight of concrete in No. 1 plug was some 1,800 tons and both were designed for a pressure of 1,250 lb. per sq. in. To avoid leakage around No. 1 plug a part of the shaft lining was blasted away. The plug was completed on October 28. The water rose to the level of the No. 1 plug and readings were taken on pressure gauges on pipes through the plug.

What actually happened then there is little chance of knowing until the mine is dewatered. Early on the morning of October 31 the water suddenly rose above the plug, drowning ten men. The water level subsequently came up in the No. 1 shaft and later found its way on top of No. 2 plug and rose to within some 600-700 ft. of the collars.

On the evidence available and from what is known about the underground water in the Free State, it would seem that the main source of the initial inflow was a tremendous cavity in which water had long been accumulating. It is this aspect where a radically different situation to that along the West Wits line exists. There the source of the water is perennial streams in the dolomites, fed from rain. West Driefontein pumps some 12,000,000 galls. a day and Venterspost some 11,000,000 galls. as a matter of course. In the Free State, however, experience so far has shown that once a source is exhausted, it is over and done with.

This may prove the case in Merriespruit, but there is the question of how many more such cavities occur in this

area and whether they are interconnected in any way. There is no firm evidence as yet as to the latter possibility, but the level in the Merriespruit shaft is fluctuating. It is being suggested that this is related to the rate of pumping in Harmony in particular where the reef is down the dip from Merriespruit, though there is nothing approaching a mining connection between the two properties. A further pointer is that No. 3 shaft Virginia which is not connected with the existing mine area has been showing a dropping water table for some months in consequence, it is believed, of the continuing pumping programme at Virginia.

If it is indeed the case that the water sources are interconnected in one mine area, such as in the case of these three mines, it seems to be a logical conclusion that they should be tackled as a whole. At the present time, with one or two exceptions, the Free State mines operate on a literally watertight basis—not only there being no interconnection underground, but a policy is pursued of not extending workings too near to common boundaries.

Engineering opinion here tends towards the view that had there been interconnection between Merriespruit and the other two mines in the area, the recent disaster might well have been avoided. As can be seen from the account of what happened, it was precipitated by the flooding of the Merriespruit pumps which did have the capacity to deal with the inflow. Had it been possible to divert some of the water to the sumps of the other mines, their excess pumping capacity could well have saved the day.

Some time back a plan was mooted that a detailed investigation should be made into the underground water situation in the Free State as a whole, but the idea was not pursued. The Merriespruit affair would seem to emphasize the need for this. It has brought home the fact that water trouble is a very real risk, in spite of the work done to combat it. Furthermore, there is the important point that it would seem that the total amount of underground water is static (in contrast with the West Wits line). If this is the case, there would seem to be grounds for tackling the whole problem on a concerted and co-operative basis.

There can be little doubt that the whole Free State is "water conscious" now, and it is almost certain that there will be a move to increase pumping capacity in a big way. There are two approaches to this. Firstly, increasing capacity on each mine; secondly, establishing group (using this geographically) pumping with flexibility being attained underground by way of interconnection.

[*With reference to the last three paragraphs, the general argument for interconnection may well be sound, but it is surprising to learn that the economic feasibility has ever been envisaged of linking points as far apart as, say, Merriespruit No. 2 shaft and Virginia No. 3 purely as an ensurance against risk of flooding.*—ED., "*M.J.*"]

Drilling the Kariba Tunnel

AN auxiliary but none the less vital stage of the 1,200 megawatt hydro-electric scheme at Kariba, Rhodesia, was the driving of the large-bore diversion tunnel. It will be sealed when its function is complete.

All drilling throughout the operation, which involved driving 1,300 ft. through gneiss and porphyry rock, was with "Golden Bullet" rock-drills supplied by Holman Bros. factory in Southern Africa. The work was completed to schedule by The Cementation Company Limited.

The timing of the Kariba programme is important. Diversion of the entire flow of the Zambesi is impracticable, and construction of the main dam has been arranged to take advantage of the seasonal variation in volume. During the low-water season of 1957 the river will be checked by a cofferdam protecting the right-hand section of the main structure. Part of the river will then pass through this diversion tunnel under right bank, and through a channel on the opposite bank.

The tunnel had to be driven below water level. Access was thus obtained from a point above flood level, by means of a dipping adit, of 18 x 15 ft. cross-section, and 880 ft. long, which was driven in fourteen weeks. The main tunnel was then driven in two directions at once. The operation took the form of a top-heading and bench-driven successively, resulting in a main bore of 33 ft. by 42 ft.

It was completed in a total of twenty-one weeks, at an overall average rate of 62 ft. per week. Three eight-hour shifts, consisting of 26 men (mainly African and untrained at the outset) were employed. Consulting engineers for this and other sections of the scheme are Sir Alexander Gibb and Partners.

Above: The site, showing foundations for a cofferdam

Below: A section of the Kariba tunnel

Ore Dressing Procedures For Canadian Ores

DURING the past 45 years the phenomenal growth of the Canadian mining industry has been accompanied by a corresponding growth in the size and scope of the Mineral Dressing Laboratories. These laboratories, with their supplementary services and research groups, now comprise the Mineral Dressing and Process Metallurgy Division of the Mines Branch, Ottawa.

Various ore dressing procedures for the recovery of metals contained in ores originating from eight provinces and two territories were described by the Division's senior ore dressing engineer, L. E. Djingheuzian, in a paper published in the *Royal School of Mines Journal*, London, of April, 1956.

A shipment of antimony ore, consisting of three lots, was received from a mine situated on Notre Dame Bay, on the north-east coast of Newfoundland. It was required to determine if the ore was amenable to flotation concentration and whether it would be possible to obtain a concentrate assaying over 50 per cent antimony. The three lots of ore were thoroughly mixed to give a head sample which analyzed:—Gold 0.01 oz./ton, silver 0.24 oz./ton, antimony 31.89 per cent, arsenic 1.55 per cent, iron 4.50 per cent, lead, 0.20 per cent, zinc, 0.20 per cent, and copper, 0.12 per cent.

Examination under a binocular microscope showed that the antimony-bearing mineral, stibnite, comprised the main portion of the metallic mineralization and appeared to be free from gangue. Other metallic minerals observed were blocky arsenopyrite and a small amount of pyrite and chalcopyrite. The gangue minerals consisted of quartz and calcite, with the former predominant.

In flotation tests it was found necessary to add the different activators and collectors by stages. Lead nitrate proved to be a better activator than copper sulphate. The ore was ground in a ball mill in water, together with reagents, to 75.4 per cent minus 200 mesh. The pulp was then transferred to a flotation cell and a rougher concentrate removed, which was cleaned once. The reagents used were: caustic soda 2.0 lb./ton, to grind; creosote coal tar 0.84 lb./ton, pine oil 0.35 lb./ton, and lead nitrate 1.00 lb./ton, to flotation; sodium silicate 2.0 lb./ton and lead nitrate 0.15 lb./ton, to cleaning operation.

Value of Standard Flowsheet

This treatment resulted in a recovery of 86.2 per cent of antimony in the flotation concentrate and 11.1 per cent in the middling product. Since part of the antimony in the middling product will eventually be recovered in the final concentrate, an overall recovery of over 80 per cent of the antimony should be realized. It is thus apparent that by using a standard flowsheet consisting of a ball mill, classifier and flotation cells, a simple and efficient method for recovery of the antimony should be possible.

Sink-float tests were carried out on two samples of manganese ore from Guysboro County, Nova Scotia. The objective was to determine whether a manganese concentrate of commercial grade could be obtained. Microscopic examination identified the manganese mineral as pyrolusite in a gangue consisting of quartz embedded in a fine clayey material. No sulphite mineralization was seen. Since it was desired to keep the material as coarse as possible for the heavy-media separation, no head sample was cut out of the shipment. The head assays of two samples were calculated from the test results and were 13.4 per cent and 12.3 per cent manganese respectively. The latter sample was crushed to minus 1 in. and the ¼-in. material was screened out. The recovery of manganese was 66.5 per cent in a sink product assaying 50.68 per cent manganese. Jigging of the minus ¼-in. material brought up the recovery of manganese to 76.2 per cent.

The Shape of Screened Ore

In a copper-lead-zinc ore from Bathurst District, New Brunswick, the constituent ores were very intimately associated. To liberate them for differential flotation, the ore had to be ground to 96 per cent minus 200 mesh. Grinding with steel balls to that fineness resulted in the production of an excessive amount of minus 10 micron fraction, which affected flotation results adversely. Grinding with rods reduced the amount of this fraction, but not sufficiently to have any marked effect on flotation results. Fine grinding investigations were therefore started, using screened pieces of the ore as pebbles in order to determine whether this method of grinding would reduce the amount of minus 10 micron fraction in the product ground to 96 per cent minus 200 mesh. The ore was a medium-soft ore. The approximate analysis was:—Copper 0.5 per cent, lead 2.0 per cent., zinc 6.0 per cent. and iron (as FeS_2), 35.0 per cent. The ore had a specific gravity of 4.2.

Experiments indicated that the grind obtained with screened pieces of ore as pebbles was similar to those obtained with steel. Flotation results, as compared to those obtained after grinding with steel, were not affected. The experiments not only confirmed the findings of a previous investigator that the original shape of screened ore does not affect grinding results, but, in addition, they showed that these results are not affected by the softness of ore. Hence, it appeared that no difficulty would be experienced in reducing the ore to the required size by using screened pieces as pebbles.

A sample of ore received from a mine in the Matachewan area, Northern Ontario, assayed as follows:—Gold 0.02 oz./ton, copper 2.10 per cent, molybdenite 0.5 per cent, iron 9.00 per cent, zinc 0.07 per cent, total sulphur 3.00 per cent, insoluble 67.50 per cent. The purpose of the investigation was to separate molybdenite from chalcopyrite and to make a commericial molybdenite concentrate.

After trying various methods, the complete operation for the most satisfactory method for recovering the molybdenite from the ore was found to be as follows:—

(1) Flotation of copper concentrate (copper concentrate No. 1); scavenging flotation of chloritic gangue slime and cleaning to make two products (copper concentrate No. 2, cleaner tailing); (3) flotation of molybdenite concentrate and rejection of a flotation tailing; (4) drying of molybdenite concentrate to depress copper; and (5) refloating of molybdenum concentrate to make two products (final molybdenum concentrate, copper concentrate No. 3).

The recovery of the final molybdenite concentrate was 0.24 per cent by weight assaying 75.99 per cent MoS_2, and 0.70 per cent Cu.

Aluminium in French West Africa

In mid-November, Aluminium Ltd., announced that it is planning an initial investment of some $100,000,000 in a wholly-owned French subsidiary for the creation of a new bauxite and alumina industry in French West Africa, to serve export markets. The following joint statement has been issued by Aluminium Ltd., and its subidiary, Bauxites du Midi.

FOLLOWING intensive engineering studies, plans have now been formulated for the creation of an important bauxite and alumina exporting industry in French Guinea. These plans are based on the development of the large bauxite deposits to be found in the territory.

The plans envisage the creation of a new industrial complex, in French West Africa about 345 miles south-east of Dakar and 185 miles north-west of Conakry in an undeveloped area of French Guinea within the Boké region. The realization of these plans will be undertaken by Bauxites du Midi, a subsidiary of Aluminium Ltd., already the bauxite mining pioneer of French West Africa.

In 1952 Bauxites du Midi commenced operations for the mining, beneficiation and shipment of this mineral from the Los Islands off the mainland at Conakry, in French Guinea. However, this undertaking was concerned only with bauxite production. It is noteworthy that to-day no alumina-producing industry exists on the African continent.

On broad lines the plans involve the development of new bauxite occurrences in the north-west area of Guinea, the construction of about 75 miles of railroad to the Antlantic coast, the establishment of new storage and port facilities at the mouth of the Rio Nunez, the construction of a chemical works with a capacity of 250,000 s.tons of alumina per year, and the construction of townsite facilities.

In order to realize the first step of the development under which the company will provide the port, railroad, and townsite installations as well as the industrial plants, it is estimated that an investment of the order of $100,000,000 will be required over the construction period of about five years. The plans will provide a foundation on which could be built a capacity many times the initial production as and when it is needed.

Approval in principle of these broad plans has already been granted by the Ministry of France Overseas which has expressed itself most favourably on this industrial development. In Guinea the Territorial Assembly has likewise expressed itself encouragingly on the development.

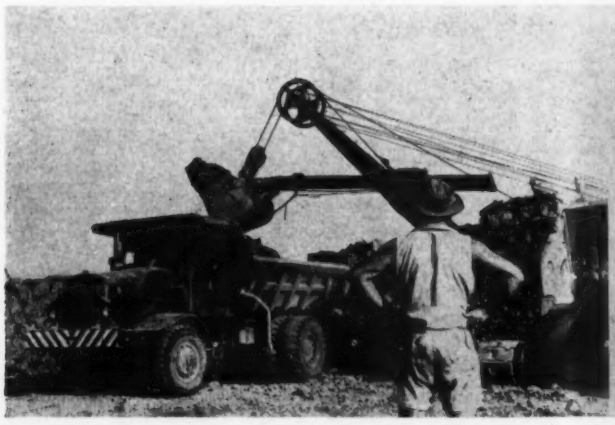
Entirely independent of the alumina project, Aluminium Ltd. agreed last March to participate in the establishment of an aluminium industry in Guinea. The creation of the aluminium industry based on the hydro-electric potential of the Konkouré River is now being studied by Péchiney-Ugine, the principal French producers of alumina and aluminium, in collaboration with Aluminium Ltd., and a group of European producers.

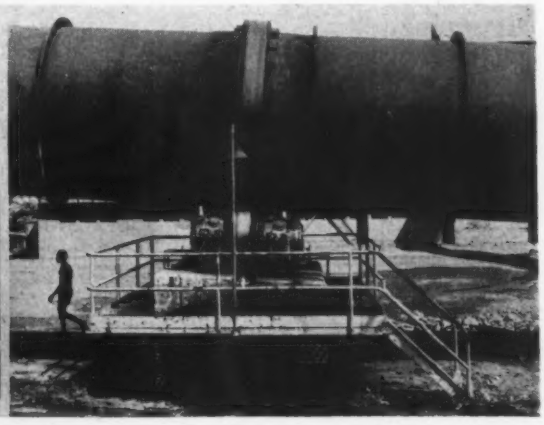
This new project is a natural consequence of a general long-term programme as well as of activities already undertaken in French West Africa by Aluminium Ltd. and Bauxites du Midi since well before the last World War.

The first stage of the programme involved the establishment of mining, milling and shipping facilities in the Los Islands capable of producing and exporting a minimum of 250,000 s.tons of beneficiated bauxite per annum. This first stage was completed in 1952 at a cost of about $12,000,000 and for the past two years, shipments from these plants to North American and European markets have been increased to about 500,000 s.tons per annum.

The second stage involved a similar enterprise on the mainland in the Boké region, also in French Guinea. About $2,000,000 have been expended since 1946 on exploration and prospecting in the region. These activities have confirmed the existence of bauxite resources of sufficient importance to justify the preparation of plans not only for a bauxite industry, but also for an alumina industry to process an important part of the bauxite into alumina in the territory. The investment of $100,000,000 will, in itself, be a stimulant of the first order to the economic development of French Guinea.

The construction of this whole industry should start in 1957. The first ton of bauxite could be shipped in 1960 and the first ton of alumina in 1961.





At left, Euclid trucks being loaded at Kassa Island to transport ore from mine to treatment plant. At right, one of the bauxite drying kilns of the Bauxites du Midi plant at Kassa Island

MECHANICAL CUTTING AND LOADING IN COLLIERIES—VII.

Coal Cutting in the U.K. with

The following article, the seventh of a series on the mechanical cutting and loading equipment used in British collieries, describes the mechanism and use of the A.B. Longwall Trepanner.

By J. M. CAW

IN its original form the A.B. Longwall Trepanner consisted of the motor, switchgear block and haulage end of the 15 in. A.B. Coalcutter with a horizontally mounted revolving cutter head. The cutter head was 2 ft. 3 in. in diameter and had three arms set at 120 degrees, fitted with cutter picks[10]. A horizontal cutting disc was arranged on top of the gearhead to dress the coal from the roof. A guide rail was provided and the machine was operated alongside a low type conveyor. Initial trials in the 3 ft. 1 in. thick Piper seam at Lodge Colliery during 1951 showed that the cutting and loading action of the trepanning head was effective and that the top disc would dress-off sticky top coal. The need for a precut along the face was found, however, in order to control the cutting horizon.

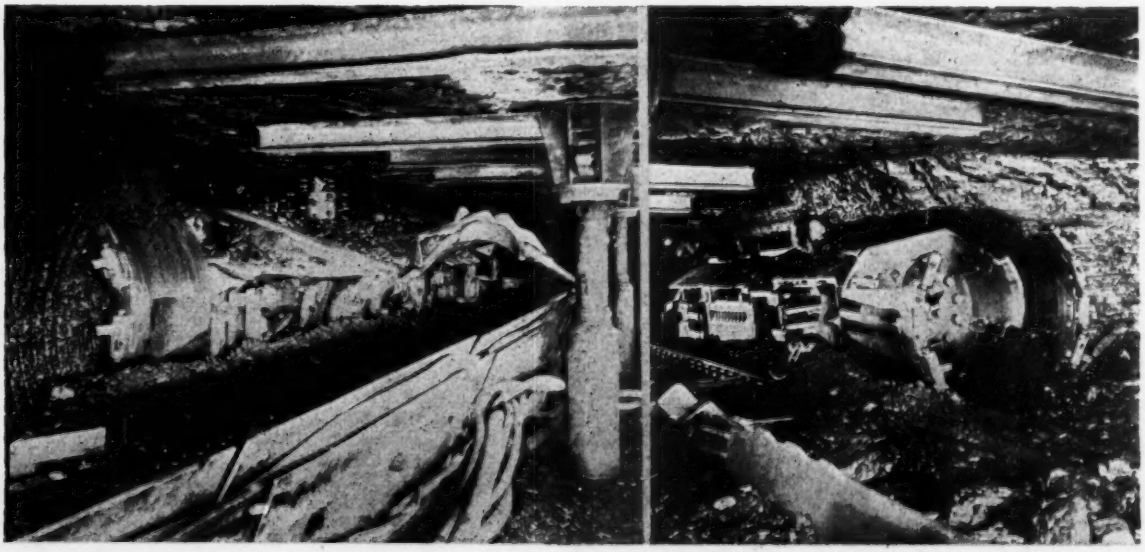
This was built into a second model having a 33 in. diameter trepanning wheel and put to work in the Coppice Colliery in 1952, under very different conditions from those at Lodge Colliery. With the precutting jib cutting to 30 in. results were good and in order to remove the necessity for deep stables in which to turn the machine and the "dead" time for that work it was decided to make a double ended model.

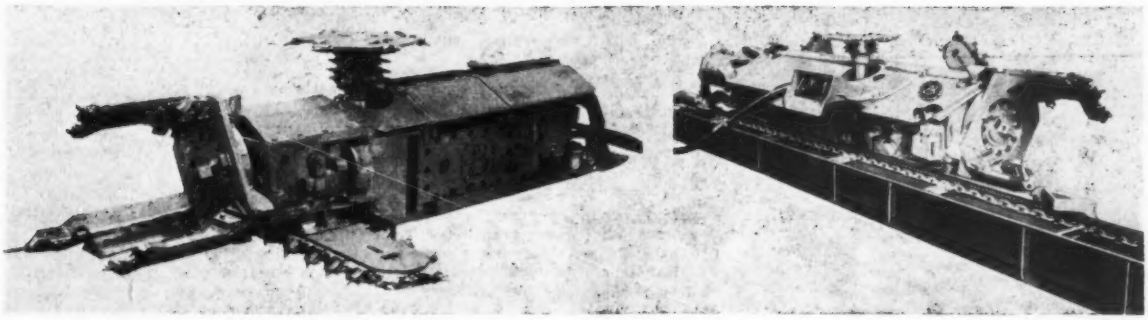
Before making this, a final test was carried out in the 3 ft. 4 in. thick High Hazel seam at Mansfield Colliery on a 142-yard advancing longwall panel. This included two 8-yard stable holes. The floor was soft and the roof a weak bind. After support difficulties had been overcome and pushing off the coal stopped by reducing the depth of precut from 2 ft. 3 in. to 1 ft. good results were obtained and Harley[10] reported that three webs were being stripped every two shifts with the machine being turned twice in that time. The turning operation took about 2 hours. Productivity was in the region of 5 tons per man shift.

The first double-ended trepanner was installed in the Low Main seam lying at a depth of 720 ft. from surface in the Ormonde Colliery. It was arranged with identical 35 in. diameter cutting heads and floor cutting jibs at each end with the 70 h.p. air-cooled motor, haulage gearcase, shearer bar, roof cutting disc and controls in between.[11]

The trepanning head has two arms each carrying eight cutter picks which are revolved slowly to cut a circular groove so that a core of coal enters the head. This either breaks along the cleats or by the action of larger picks mounted inside the head. It is then thrown sideways on to the conveyor by the rotating arms. The floor cutting jibs are designed to cut a level floor for the next cut of the machine. They can be slewed and parked under the trepanning wheel when trailing. Gummings from the floor cutting jib are loaded on to the conveyor by paddles fixed to the back of the trepanning wheel. The shearing jib, which is of the thin kerf type, can be hydraulically adjusted for height. If the roof parting is good the cutting disc can be removed and replaced by the shearer bar carrying "mushroom" picks. The column is hydraulically controlled and can be adjusted for height whilst the machine is running.

The A.B. Longwall Trepanner in action underground. At left, the double-ended machine, and at right the single-ended unit.





At left, the single-ended and at right the double-ended, A.B. Longwall Trepanners.

The controls are mounted on the gob side where they are carried out over the conveyor by a heavy canopy capable of breaking excessively large lumps of coal which will not pass beneath it. Haulage is by means of a $\frac{5}{8}$ in. chain which is anchored at one end of the face and wound over a sprocket on the conveyor side of the machine. The sprocket is hydraulically powered at variable speed, forward and reverse.

the A.B. Longwall Trepanner

The machine cuts a web 27 in. thick in a minimum seam section of 39 in. Since it is used to cut on a buttock the conveyor is laid close up to the face.[11] Above the core cut by the trepanning head the coal is cut to roof level by the shear jib or shearer bar and collapses it on to the sloping top of the machine body which deflects it on to the conveyor. The shearer bar can be surmounted by a cutting disc to make a coal roof or cut at roof level if necessary.

At Ormonde 240 yards of face 20 degrees " off end " is cut and loaded by the machine. Starting in May 1954, by August cutting speeds of 8 ft. per min. had been reached and up to 1,000 yards cut in a double shift. The machine could be traversed into position for a return journey along the face in 30 min. As with other installations where the face advance is rapid the problem of moving up the supports rapidly has arisen and the indicated solution is one of " mechanized timbering ". The estimated output for this machine assuming smooth working is 630 yards of face cut, including three traverses in the stable, in one shift.[11]. The following distribution of labour is given for work at the face in Ormonde Colliery.

Job	*Day*	*Afternoon*	*Night*	*Total*
Machine drive	1	1	—	2
Advance slide bars	2	2	—	4
Snake conveyor	2	2	—	4
Withdraw and re-set props	3	3	—	6
Advance chocks	3	3	—	6
Cable man	1	1	—	2
Total machine team	12	12	—	24
Left-end and stable	3	3	—	6
Right-end and stable	4	4	—	8
Conveyor driver	2	2	—	4
Shotfirer	1	1	—	2
Rippers	—	—	9	9
Total coal face	22	22	9	53
Fitters	1	1	1	3
Deputies	1	1	1	3
Total others	2	2	2	6
Grand Total	24	24	11	59

During November 1954 a saleable face O.M.S. of 12.1 tons was obtained, details of which are given below.

Details	*Actual performance for the four weeks ended* 27.11.54	*Best weekly performance week ended* 27.11.54
Total length cut and loaded	18,625 yd.	5,490 yd.
Total face advance	156 ft. 9 in.	46 ft. 7 in.
Average coal section	3 ft. 7 in.	3 ft. 7 in.
Machine shifts worked	44	11
Saleable output	15,475 tons	4,786 tons
Face manshifts worked (inc. overtime)	1,275	332
Length cut per machine shift	423 yd.	499 yd.
Face advance per machine shift	3 ft. 7 in.	4 ft. 3 in.
Saleable output machine shift	352 tons	435 tons
Saleable face OMS	242.7 cwt.	288.4 cwt.
Face labour cost per ton	5s. 1.5d.	4s. 4.7d.

A sizing comparison with a hand-worked face also on the low main seam is given below.

Size	*Ormonde Colliery Trepanner face*	*Coppice Coll. Machine-cut hand-filled face*
Plus 3 in.	37.9 p.c.	34.6 p.c.
— 3 in. to 2 in.	5.9	9.0
— 2 in. to 1 in.	13.2	15.3
— 1 in. to ½ in.	13.4	12.7
— ½ in.	29.6	28.4
Proceeds from 100 tons	£317 15s. 1d.	£315 0s. 9d.
Av. selling price	63s. 6.6d.	63s. 0.1d.

The main dimensions of the double-ended trepanner are : length 19 ft., width 3 ft. 3 in., height 3 ft. 2 in., with a weight of 8 tons. During 1955 four of these machines working in seams between 3 ft. 3 in. and 3 ft. 7 in. thick produced 252,773 tons.

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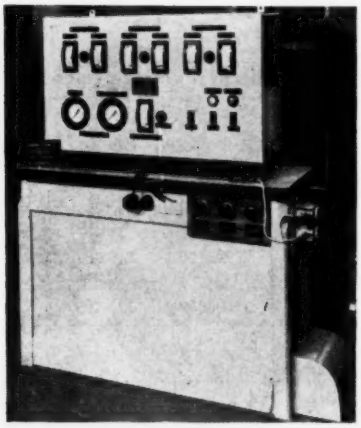
11 Sidall, N. and Thorpe, R. H. Continuous mining with the A.B. Longwall Trepanner. April 1955.

Machinery and Equipment

New Control for Air Compressors

A new control and protection panel for air compressor installations has recently been introduced by Holman Bros. Ltd. It is believed to be the first by a British compressed-air plant manufacturer to comply with the new National Coal Board (Production) Codes for reciprocating compressors. In addition to providing temperatures and pressure data for both air compression stages, the system also records cooling water temperature and lubricating oil pressures and temperature.



Protection is provided by an automatic shut-down system operating from the air delivery thermometers, oil pressure and cooling water flow. Irregularities in any of these result in the plant coming to a standstill. Unrectified faults in the panel itself also result in shut-down.

In detail, the instrumentation includes three pressure gauges for recording air delivery pressures from both air compression stages and oil pressure. Easy-reading dial type thermometers record inlet and discharge temperatures from both air compression stages, as well as cooling water and oil temperatures. Each protective instrument has a red warning lamp to indicate the source of the fault, in addition to an audible alarm which can be remotely fitted if necessary.

A TWIN DRILL TRENCH RIG

The Twin Drill Trench Rig manufactured by The Climax Rock Drill and Engineering Works Ltd., has been designed to meet the increasing demand for a rig which will drill large numbers of holes quickly for trenching purposes.

The rig consists of a "U" frame of heavy-gauge steel tubing, on which are mounted two chain-feed drill carriages. The universal cone clamps, by means of which the drill carriages are mounted, enable them to be swivelled so that drilling can be carried out either vertically or through wide angles.

Each of the two Climax four-inch D.Q.D. cradle-mounted drifters is fed and withdrawn by an endless chain, which is driven by a powerful four-cylinder air-operated feed motor. The chain tension can be adjusted at the rear end of the drill carriage. Accurate collaring of holes is ensured by drill steel centralizers. Separate air line lubricators are saddled to the "U" frame, and ensure an adequate supply of lubrication to the drifters and the feed motors.

The whole rig is suspended over a trench by means of a lifting eye which is secured to the "U" frame by heavy-duty clamps. This method of suspension permits drilling in trenches of all widths, from very narrow to a maximum of 6 ft.

NEW HOSE COUPLING

An entirely new hose coupling is announced by Bowden (Engineers) Ltd. Named the Bowdenfix coupling, it is made of nylon. Already in use is the leading steel mills and coal mines of Europe for aid and water lines, it has wider additional applications.

The design is claimed as unique. The coupling functions in the following manner:— The female end fits to a supply point or tool. The other end, without being disconnected, accepts the free end of the hose, and the body portion of the coupling is screwed up by hand until the hose is securely locked. In this action the hose is progressively held by a helical internal steel spring. The interior of the body being of conical section, a perfect fit and lock is thus made as the body section is screwed up.

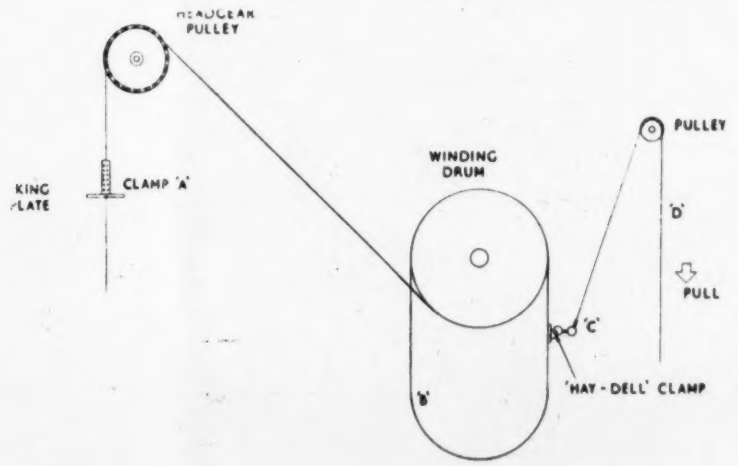
Important advantages accruing from this design are that for a given inside diameter the Bowdenfix coupling can accept hoses of widely varying wall thicknesses, the coupling need never be dismantled, no special tools are required for attachment, and no preparation of the end of the hose is needed. The coupling is now available for hoses up to one-inch inside diameter, and to withstand air and fluid pressures of up to 200 lb./sq. inch.

ROPE CLAMP ELIMINATES MANHANDLING

A clamp designed to eliminate manhandling of winding ropes during adjustment of the ropes on winding drums, has been devised in the East Midlands Division of the National Coal Board.

The device is of forged steel, and consists of a shoe which carries a pin passing eccentrically through a curved roller. This roller is integral with a lever. The winding rope passes between the roller and shoe, and when an effort is applied to the far end of the lever through a "D" link, the eccentric connection between the roller and shoe causes the device to clamp firmly on to the rope. The clamp mechanizes the operation of surging the rope round the winding drum for rope length adjustment.

The method of using the device is shown on the drawing. With the cage or skip at the bottom of the shaft the winding rope is clamped at the pit top. Slack rope has been given by the winding engineman and is hanging in a loop. There are usually three or four coils of rope on the drum between where the rope leads off it to the cage and where the rope is attached to the drum. These are called the dead laps, and the rope hanging in the loop has to be passed round these. The device is attached to the rope as shown at point C and the slack rope B is pulled round the drum by means of the cotton rope D. On releasing the pull on rope D the clamp slips down under its own weight and is ready for the next pull.



Above is shown the new control and protection panel for air compressor installations manufactured by Holman Bros. Ltd. Opposite is the clamp designed, in the East Midlands Division of the N.C.B, to eliminate manhandling of ropes on winding drums

MINING MISCELLANY

According to Mr. Manubhai Shah, Minister for Heavy Industries, the Government of India is to set up a Development Council for non-ferrous metals in order to stimulate production.

★

A reference Library of core and screen samples is to be established by the Victorian Mines Department. The nucleus of the library will be housed in a provisional core-shed, which is under construction at the Mines Department Store, South Melbourne.

★

Crescent Rutile N.L., an Australian company, has completed a satisfactory contract for the sale of 9,000 tons of rutile. Deliveries will be spread up to 1960. The buyers have requested a first option on the balance of the company's total output of rutile.

★

The first self-unloading ore ship to be built in Scandinavia has been launched by the Uddevalla shipyards, south Sweden. Built for the Caribbean Steamship Co., S.A. of Panama, she will carry bauxite from Jamaica for the Reynolds aluminium plant in the U.S. The vessel is about 17,300 tons deadweight.

★

Canadian mining experts at present visiting Ireland are to be asked to survey tungsten deposits at Glendamurk, County Mayo. The local development association claims that the deposits are considerable and samples have already been sent for analysis. Earlier this century these deposits were worked on a small scale.

★

State geologists in the U.S. have confirmed the existence of a rich ilmenite ore body in South Jersey. Fourteen boreholes have been sunk to date and detailed examination of samples from three of them, together with visual inspection of others, are said to indicate a high ilmenite content throughout the belt so far examined.

★

A company known as the Inter-American Uranium Corporation has been set up in Cuba with the object of exploring possibilities of extracting uranium, especially in the province of Pinar del Rio. One of the vice-presidents of the new company, Mr. William S. Schneider, is a member of the Laboratory for Investigation of Atomic Energy in the U.S.

★

According to Mr. S. H. Baig, a member of Pakistan's National Committee of Geological Sciences, the Chitral Valley is potentially as rich, if not richer, than Luxemburg and the Saar. It contains iron ore, mica, graphite, copper ore, marble, lead, zinc, arsenic, mercury, and precious stones. The largest and richest iron ore in the Valley, it was stated, has been found to be 72 per cent pure.

★

The establishment of a Sierre Leone Diamond Areas Development Authority has been announced by the Governor, Mr. Maurice Henry Dorman. The authority will develop new fields, set up new towns, and rehabilitate abandoned swampland. The right granted to Africans to dig diamonds for themselves is reported to have caused a "diamond rush" which is attracting Africans from outside Sierra Leone.

★

Full production of uranium is expected shortly at Algom Uranium Mines, which has started to feed ore to its Quirke Lake mill at Blind River, Ontario. Algom has a $206,900,000 letter of intent from Eldorado Mining and Refining for the sale of precipitates. It has the second largest order in Canada and will be the second producer at Blind River.

★

The Brazillian National Department for Mineral Production recently surveyed a bauxite deposit situated at the mouth of the Maracume River on the borders of the States of Para and Maranhao, and has estimated its content at some 10,000,000 tonnes. Thorough chemical investigation of the deposit is now being carried out in the Department's laboratories at Rio and average alumina content is reported to range from 30 to 40 per cent.

★

The chairman of Vancouver's Metropolitan Development Commission, Mr. James S. Eekman, has stated that news should be breaking very soon about the construction in Vancouver of a major steel mill by foreign interests and of a custom smelter to refine and smelt copper, lead, zinc and silver concentrates from British Columbia. He said that the steel mill would probably be built by German or Japanese interests, with Canadian participation.

★

Central Mining and Investment Corporation have obtained an option to acquire the controlling interest in Consolidated Chrome Corporation which is actively engaged in mining and exporting chemical and refractory grade chrome ores from three mines in the Rustenburg district. The total output of the company is marketed through the British Metal Corporation (South Africa). This development is of significance in that it is the first hint of a new venture by one of the two major mining groups involved in the Central Mining-New Consolidated Gold Fields merger.

★

Developments in the Chibougamau area of Northern Quebec are proceeding on a scale which appears destined to place this new mining field among the more highly productive copper areas in Canada. Heretofore the area has been serviced by air transport and by highway. However, the new railway under construction has progressed to within 35 miles of the camp, and will come into full utilization in the coming year. The aggregate ore resources appear destined to be measured ultimately in tens of millions of tons, with the ore grading from 2 to 4 per cent copper. Playing leading roles in the Chibougamau area are Campbell Chibougamau, Copper Rand Chibougamau, Opemiska Copper, Chibougamau Jaculet, and Merrill Island, together with various other substantial enterprises.

★

African Metals Corporation, a subsidiary of the South African Iron and Steel Industrial Corporation (Iscor), which produced 47,378 tons of ferro-alloys last year is extending its plant. The three main alloys produced are ferromanganese, ferrochrome and ferro-silicon. For the first time the Corporation is selling ferrochrome, made entirely from South African ores, to the U.S. Known reserves of chrome ore in the Transvaal amount to several thousand million tons.

★

Negotiations are nearing completion for the supply of 2,000,000 tons of iron ore annually from India to Japan—approximately double the present volume of shipments. Japanese steel manufacturers have formed a joint body to purchase the ore. An Indian official delegation, headed by Mr. B. K. Kochar, of the Ministry of Commerce, Government of India, is now in Japan discussing the terms under which India will supply large quantities of iron and manganese ore, in return for considerable quantities of iron and steel.

★

By a joint decision of the Ministers for Co-ordination, Finance and Industry, the import has been approved of $108,000 worth of equipment by the Brussels Mining Enterprise Co. for the development of manganese mines in Styra-Euboea. It is anticipated that the annual output of these mines will amount to 10,000-15,000 tons of ore worth $400,000—$500,000, most of which will be exported. Under another joint decision of the same Ministers, the export was approved by a Norwegian company of $100,000 worth of goods for the development of the manganese mine at Kafkaki-Tyrnavos. The output of this mine is forecast at 10,000-12,000 per year and will be mainly for export to Norway and Germany.

★

Experiments are in progress in the U.S. with automatically-controlled helicopters as an aid to surveyors. The aim is to provide a fixed position indicator above the ground which can be used by the surveyor for sighting purposes. The system depends on photo-elecric cells fitted beneath the body of the aircraft, by means of which the helicopter can be made to hover over a beam of light thrown up from the ground. The system is being investigated by the Kaman Aircraft Corporation.

★

On November 23 Sir Andrew Cohen, Governor of Uganda, opened the Western Extension from Kampala to Kasese of the East African Railways system. The extension will serve the copper mines of Kilembe, a joint project of Frobisher, the Colonial Development Corporation, and the Uganda Development Corporation. The Governor's programme also included the official opening of the concentrator at Kilembe and the smelter which has been established at Jinja to handle the copper ore. Production of ore at Kilembe has been steadily

increasing and it is expected that by the end of the year the initial target of 40,000 tons monthly will have been reached. This will yield an annual production of some 8,000 tons of blister copper and 400 tons of cobalt.

★

Indonesia is prepared to grant mining concessions for three years for exploration and for 30 years of exploitation, according to a Government Bill now before Parliament. The bill regulates mining in Indonesia but only in a general manner. Exploitation of petroleum resources will be controlled by a separate law. The bill declares that all minerals on and in the soil, in the sea as well as on land, within Indonesian territory are State property. Indonesian territory is defined as including the submarine territories around the Indonesian archipelago and outside the territorial waters, if the depth is less than 200 metres at low tide. Concession rights and licences based on the Netherlands Indies Mining Act, which the bill supersedes, remain effective on the understanding that the holders should "adapt themselves to the new Act within a certain period".

★

The Transvaal Ore Company Ltd., of Johannesburg, Rio Tinto of England and Newmont of the United States have decided to form the Phalaborwa Mining Company for the exploitation of the copper ore deposits at Phalaborwa in the North-Eastern Transvaal provided a mining lease is granted by the Government. Though of low grade, this deposit contains enormous quantities of ore. As much as £15,000,000 may be invested in the next few years. It is understood that Transvaal Ore and Rio Tinto together hold the controlling interest in the new company. Transvaal Ore owns and works the vermiculite deposit of Phalaborwa which is one of the biggest in the world. Towards the end of 1955 a plant came into operation at Phalaborwa for the manufacture of phosphate concentrates from the huge apatite deposits which are also found in this area.

★

At a ceremony on November 20, held simultaneously at the Board of Trade in London and in Brussels, the two gatherings linked by the G.P.O., the president of the Board of Trade, the Rt. Hon. Peter Thorneycroft, pressed in London a switch which set a bulldozer in motion on the British site for the Brussels Universal and International Exhibition, 1958. This marked the beginning of work on the site. About 50 nations, and international organizations will be represented at the Exhibition. Great Britain has taken one of the largest sites.

PERSONAL

As and from December 31, 1956, Mr. D. P. V. Neave is resigning as vice-chairman and joint managing director of the Consolidated Zinc Corporation Ltd. and as a director of the Corporation and its subsidiary and associated companies. As from the same date he is also resigning his directorship of New Broken Hill Consolidated Ltd.

★

Sir Eric Mieville has been appointed a director of Amalgamated Tin Mines of Nigeria.

★

Mr. W. R. Carr has joined the board of Rosterman Gold Mines.

Mr. Harold W. Bishop has been appointed an additional director of the Bolivian and General Tin Trust.

★

Dr. W. H. Garrett has been appointed an additional director of Metal Industries Ltd.

★

Mr. G. W. Alexander, chief engineer of Powell Duffryn, has been appointed a director of its subsidiary, the Cambrian Wagon and Engineering Co.

★

Mr. A. H. Ball has joined the board of the Cam and Motor Gold Mining Co. (1919) Ltd.

★

Dr. Zay Jeffries, a former president of the American Society for Metals and a former vice-president of the General Electric Co., has been appointed director general of the Second World Metallurgical Congress, which will be held in Chicago from November 2—8, 1957. He is a member of the American Academy of Science.

★

Mr. J. S. Crawhall, a director of the Cementation Co. Ltd. and managing director of the Cementation Co. (Africa) (Pty.), Ltd., is returning to Johannesburg after a visit to Britain. He will be breaking his journey at Rome.

★

The National Coal Board announces that, since Major-General Sir Noel Holmes will shortly reach the age of 65, which is the normal age for retirement from the Board's employment, he will vacate his appointment as chairman of the North Eastern Division on January 31, 1957. Mr. W. H. Sales has been appointed in his place. The Minister of Fuel and Power, at the request of the National Coal Board, has agreed to the termination of Mr. Sale's appointment as a Member of the National Coal Board at the same date.

★

Following previous practice, the 1956 edition of *Canadian Mining Manual* contains authoritative articles on the progress and problems of the mining industry throughout the world. Much of the information has been drawn from the technical press in other countries, including the U.K. Successive issues of the Manual, thus constitute a valuable series of reference volumes, which are of world-wide interest. A valuable feature of the publication is the directory of manufacturers and supply companies functioning in the Dominion, which becomes larger every year, indicating the rapid expansion of the Canadian economy.

★

To assist fuel oil users during the present period of restricted supplies, the Federation of British Industries, in co-operation with the National Industrial Fuel Efficiency Service, has compiled a leaflet entitled "Hints on Saving Fuel Oil," which is being distributed to F.B.I. members and is also available at the F.B.I. headquarters, 21 Tothill Street, London, S.W.1.

★

A survey entitled "Coal as a Raw Material" has been published by the Royal Institute of Chemistry, 30 Russell Square, London, W.C.1, from whom copies are obtainable (price 4s.). The survey is an expanded account of a lecture to the Royal Institute of Chemistry at its Anniversary Meetings in April, 1956. The author is Dr. W. Idris Jones, Director of Research.

★

A survey of the Courageous-Matthews Lakes area, district of Mackenzie, Northwest Territories, has been published by the Geological Survey of Canada as Memoir 283.

★

A handbook entitled "Applications of Instrumentation and Automatic Control" has been published by the Federation of British Industries, 21 Tothill Street, London, S.W.1 (price 5s.).

★

Courses on the presentation of technical information — reports, brochures, articles, lectures—are being held by Osmond Turner Mead Associates. They will run for ten working days and will be limited to eight members. The three now planned will start in London on November 26, 1956, February 25, and April 29, 1957.

★

A new craft training school for apprentices employed by British Oxygen Engineering Ltd. was opened at Angel Road, Edmonton, London, on November 15 by Mr. Robert Carr, M.P., the Parliamentary Secretary to the Ministry of Labour.

★

Plastics manufacturers from at least eight countries will be exhibiting at the first international British Plastics Exhibition, which will be staged in the Grand and National Halls, Olympia, from July 10-20, 1957.

★

The Copper Development Association will be moving on December 10 to new premises which have been acquired at 55 South Audley Street, London, W.2. The Association will continue its existing activities, but hopes that the move to London will bring it in closer contact with all who are interested in its work.

CONTRACTS AND TENDERS

Acrow (Engineers) Ltd. have been awarded the contract for all the steel form-work for the Kariba project, the first part amounting to over £100,000. The order was placed by Impresit Kariba Ltd., the main contractors for the project.

★

Babcock and Wilcox Ltd., of Renfrew, have received an order for the construction of the reactor vessel for Canada's first nuclear power plant—the first in the Commonwealth outside the U.K. The Canadian General Electric Co. are the main contractors for the project.

AGENCIES WANTED

N. V. Landreand Glinderman's Werktuig, en Gereedschapshandel, Spuistraat 6-8, Amsterdam C, are interested in representing a U.K. manufacturer of light alloys, such as aluminium alloys, in the form of tubes, pipes, sheet and forgings. Manufacturers interested should write direct to the Amsterdam firm, notifying the British Embassy, Commercial Department, Lange Voorhout, 32 The Hague, that they have done so. B.O.T. Ref.: E.S.B./28087/56. Telephone enquiries to Chancery 4411, extension 776.

Metals and Minerals

Industrial Diamonds Dearer

The Belgian diamond producers and Industrial Distributors (Sales) Ltd. have announced that at the beginning of December the price of crushing boart will be raised from 16s. 9d. a ct. to 18s. 3d. This is the first increase by the main distributors for some time, although parcels have been changing hands on the Continent and elsewhere at much higher prices for several months. Even before the Suez crisis sales at prices at least 50 per cent above those fixed by the main distributing organization had been reported.

In his market report for October, 1956—issued before the announcement of the price increase—Mr. Johan J. Smit, Snr., referred to the growing importance of industrial diamonds, especially in war-time, when crushing boart was stabilized at $1.80 per ct. in the U.S., while during the occupation of Holland 60 times this price was paid. He pointed out that the price of this commodity, giving standard value to the bulk of industrials, was more than $1 per ct. higher on the open market than at the source of supply. U.S. imports for home consumption are about 8,000,000 ct. a year. Mr. Smit suggested that behind the "Curtains" approximately half that amount was bought on the black market. Speculation was encouraged, and it was noteworthy that in the event of international troubles, such as the Korean war and the Suez crisis, prices went up.

Crushing boart has remained scarce in recent years because of the continued expansion of industrial production and because of its growing applications. Meanwhile, the output of the Belgian Congo, which produced some 96 per cent of the world's industrial diamonds, has been expanding only slowly. Total production last year amounted to 12,830,000 ct. against 12,619,378 ct. in 1954.

LARGE TUNGSTEN DEPOSITS

The Turkish Ministry of Mines has announced the discovery, near Manyas, of a deposit of wolfram ore which, it states, is very rich. Newspaper reports indicate the ore content of the deposit at 2,000,000—3,000,000 tons.

★

Rights to one of the Western world's largest deposits of strategic minerals have been acquired by the National Tungsten Corporation of Los Angeles. Signing of an agreement giving National Tungsten a 50 per cent interest in the property, as well as exclusive operating and management rights, has recently been concluded between National Tungsten and Kolombo International Corporation. Situated west of the Andes, the property contains tungsten, mercury and manganese deposits with an estimated value of $1,500,000,000. The over-all size of the ore bodies is estimated to exceed 75,000,000 tons. A Chilean subsidiary company owned jointly by the two American firms will be set up to own and operate the property. Minimum production, placed by the contract at 2,500 tons of ore per day, will be achieved in eight months.

U.S. FREES SIX METALS

Cancellation of the quota system, designed to guide military contractors toward the best quantitative use of six critical materials in the manufacture of aircraft gas turbine engines, has been announced by the U.S. government. The system is now being replaced by a simple reporting arrangement to serve as a warning if the position of materials deteriorates. The metals concerned are cobalt, nickel, chromium, columbium, molybdenum and tungsten. The change does not alter the policy of the Department of Defence that requires the military departments to use nickel and other currently short materials with close attention to conservation. However, it does signify that reserves of the materials in question are adequate to meet present mobilization requirements with respect to the usage of critical materials in engine designs now in service.

ENCOURAGEMENT FOR INCO

In order to encourage the projected $140,000,000 Moak Lake development, the Manitoba government has offered Inco a 65-year lease on its nickel-copper claims, on the examination of which Inco has spent several million dollars. A lease of this duration would involve an amendment to the existing limit of 21 years to a crown lease. Inco officials are reported to have told the Manitoba government that the relatively low-grade ore indicated by drilling so far would warrant a long-term lease in order to justify the development expenditure.

ALUMINIUM IN THE US.

The U.S. government has ended its tax relief programme for the aluminium industry. The Office of Defence Mobilization announced the closing of five expansion goals under which aluminium processing facilities were granted permits for rapid amortization for tax purposes. The goals for welded aluminium tubing, aluminium sheet producing and heat-treating facilities, tapered aluminium sheet, aluminium forging facilities and heavy aircraft forging were closed because the present capacity is sufficient to meet any mobilization requirements. These were the last of eight types of aluminium processing facilities eligible for tax relief.

BELGIAN GERMANIUM

Ste Metallurgique de Hoboken (Anvers) has announced that new installations have been set up, which will allow the company greatly to increase its output capacity of germanium metal. Minerals containing this element are supplied by Union Miniére and the Tsumeb Corporation of South-West Africa.

With effect from November 12, the duty payable on germanium dioxide imported into the U.K. has been reduced from 33⅓ to 25 per cent. The effect is that kilo lots of imported material are now available at 1s. 9½d. per gram, against 1s. 11d. formerly.

NEW ZIRCONIUM PROCESS

The Australian Government has sold to the National Distillers Corporation of the U.S. for $250,000 world patent rights, other than Australian, to a new process for the extraction of hafnium-free zirconium from mineral-bearing sands. The sale is subject to "certain conditions of development."

NEW URANIUM PROCESS

Ste. Metallurgique de Hoboken is to start contract negotiations on a proposal by the General Chemical division of Allied Chemical and Dye Corp. for changing uranium ore concentrates into a purer state. The production of compounds termed uranium salts, from which the pure uranium metal is obtained, is at present limited to government-owned plants. The company's proposal to furnish 5,000 tons a year of purified uranium salts from uranium concentrates supplied by the A.E.C. provides the lowest cost to the government of any of seven bids received for private participation in this phase of the atomic energy programme. The programme was announced in 1955 and the bid deadline was October 1 last. Allied will employ a new process that will simplify purification by cutting out the refining step. The company will have its new plant in operation by April 1, 1959.

WOLFRAM MARKET QUIETER

A quieter tone is reported in the wolfram ore shipment market and most dealers are indicating a slightly lower level of values for the first time since the Middle East crisis reversed the downward trend. European buying interest appears to have tapered off, presumably because most consumers have now covered their requirements for the time being.

PLATINUM FUTURES

Further details have been released by the New York Mercantile Exchange regarding the start of trading in platinum futures on December 3. The standard future contract of 50 troy oz. will call for delivery of 99.5 per cent pure platinum. The rest of the content must include 0.3 per cent of related platinum metals (e.g. palladium), while the other 0.2 per cent can be any other metal. Lucius Pitkin, Inc., have been appointed official assayers to assure performance of contract standards on both spot and futures transactions. The futures contract provides for four delivery months in a year—January, April, July and October.

COPPER · TIN · LEAD · ZINC

COPPER MARKS TIME

Both here and in the States the copper market continues to mark time, although in the absence of any immediate worsening of the international situation the tendency for the U.S. price to ease has been underlined by a half cent cut to 35¼ c. by the International Metals and Minerals Corporation, although the leading custom smelters show no signs of following this lead and report little available nearby metal. Brass mills still report a subnormal though slightly increased demand from the car industry but appear to be booking only about two-thirds of the business they could take. Fabricators' stocks are recorded to have declined by some 5,000 s.tons to 440,000 s.tons at the end of October but still stand at about 100,000 s.tons up on the figure of a year ago. New orders booked at 114,500 s.tons (only 6,000 less than October, 1955) were approximately in balance with producers' deliveries.

★

A Reuter message from Santiago suggests that Krupps may form a consortium with the Nord-Deutsche Affinerie and the Lurghi group to tender for the construction of a copper refinery and shipyards. The tender for the refinery closes to-day.

★

The month-old strike at Cerro de Pasco's smelters was settled last Monday. Mining operations continued during the stoppage so that the backlog in production should be made good fairly quickly.

★

No more has been heard of the reported discussion between R.S.T. and Rho-Anglo regarding a common copper marketing policy and in view of Sir Ronald Prain's spirited defence of the present R.S.T. pricing methods in his statement to shareholders last week it may well be that we have heard the last of this particular *demarche*.

★

The Commission of Enquiry into unrest on the Copperbelt set up by the Northern Rhodesian Government under the chairmanship of Sir Patrick Branigan has published its report. The brief summaries of the report so far reaching London indicate that the Commission holds the African Mine Workers Union as principally to blame for the recent disturbances but found no evidence of direct interference with the African National Congress as such, although certain leaders of the Congress had undoubtedly influenced public opinion against the African Staff Association. A notable recommendation of the Commission is that criteria used by mining companies for classifying staff jobs should be embodied in the existing agreements between the companies and both the African Mine Workers' Union and African Staff Association. This seems to us to be eminently sound and we cannot help feeling that the difficulties of the past summer could have been considerably eased had this step been taken as soon as the African advancement programme had been agreed with the European Mineworkers.

As far as can be ascertained at present, the other recommendations are concerned principally with proposals for strengthening the African personnel departments at the mines and the union organization at subordinate levels, also with the reduction in the numbers of paid officials in the union particularly at headquarters and with the introduction of better financial management by the union and of regular inspection of unions accounts.

TIN SHOULD GET EASIER

For the moment the tin position appears to be getting slightly easier in the States as imports began to move again following the nine days dock stoppage. Stocks of tin at L.M.E. warehouses also increased last week by 255 tons and stood at 929 tons on November 24. Meanwhile uncertainty remains regarding the outcome of the present wage negotiations at the Straits Trading Co.'s Butterworth smelter where the unions are demanding a 50 per cent pay increase with fringe benefits. North Malayan ores are already being diverted to the Singapore smelter as a precaution.

Ore shipments to the Texas smelter should by now be virtually completed and all Indonesian output is presumably going to the Arnhem smelter. The bulk of Bolivia's output is expected to go to Liverpool although a portion of this may also go to Arnhem.

Thus one way and another there should be a noticeably greater availability of metal within two to three months even if Eastern shipments have still to go around the Cape.. Nevertheless the gap between supply and demand can hardly be very large next year. On the other hand, the potential in the Congo (and less immediately, in Indonesia and Thailand) for increasing production must be considerable and the industry is certainly well able to face any foreseeable long-term increase in demand with equanimity.

★

Reports from La Paz foreshadow a substantial reorganization of the Bolivian Mining Corporation and suggest that proposals now under consideration cover the strengthening of the Mining Corporation's autonomy, standardization of machinery and materials, a new minerals production programme, increased exploitation of new deposits and administrative and technical reform based on recommendations made by the American consultants Ford Bacon Inc. Measures are also apparently being sought to curb trade union interference problems, and find new sources of hydro-electric power.

LEAD AND ZINC FIRM IN U.S.

While the affects of the oil shortage on European lead and zinc requirements have yet to be assessed, the States reports a good volume of December sales for lead, with battery manufacturers still buying well. Sales of domestic lead in the week November 21 were at 12,284 s.tons, the largest for nearly two months and almost double the sales reported in the preceding week.

Zinc producers similarly report a rather better market this week with galvanizers buying strongly for prime western. Special high grade suppliers also report slightly better demand from the car industry.

Naturally the U.S. lead and zinc markets are becoming increasingly concerned as to probable Washington policy on stockpiling after the completion of the O.D.M.'s long term stockpile programme. The popular view at the moment seems to be that some form of government support buying will continue, but that it is more likely to take the indirect form of accelerated bartering of surplus farm commodities for foreign lead and zinc. This will obviously be a cheaper form of stockpile buying for the Government and should have precisely the same effect in syphoning off surplus world stocks as did the long term programme of buying domestic ore at the market price.

★

Imports of lead (refined and in ore together) totalled 328,356 s.tons during the first nine months of this year compared with 313,586 s.tons in the corresponding period a year ago. Imports of zinc (metal and in ore together) for the nine-month period totalled 393,385 s.tons (353,434 s.tons a year ago).

The London Metal Market

(From Our L.M.E. Correspondent)

Quiet conditions continue to prevail on the Exchange, and in the absence of any fresh developments price movements have been on a restricted scale. The copper market staged a mild recovery on Tuesday when prices advanced about £5 from the previous afternoon's close, but since the initial buying spree immediately following the outbreak of hostilities between Israel and Egypt consumers have tended more and more to withdraw from the market and adopt an attitude of "Wait and see". Basically the outlook for copper has undergone no fundamental change, and unless the international situation should take a serious turn lower values are looked for in the long run in most quarters.

Consumer demand for tin in the Straits has been on a better level recently, but in Europe buyers have been reserved pending a reassessment of industrial production as a result of the cut in oil supplies. A further improvement of just over 250 tons in the U.K. warehouse stock figures bringing the total to 929 tons has resulted in a narrowing of the backwardation to around £12 per ton. On Thursday morning the Eastern price was equivalent to £843¼ per ton c.i.f. Europe.

There are no special features as far as lead and zinc are concerned. As pointed out last week both metals stand to be particularly affected as a result of oil and petrol rationing and the consequent effects on the motor car industry, which is responsible for a good proportion of zinc consumption and also of lead both in batteries and in motor fuel. In the States the G.S.A. has called for tenders for both metals for delivery to the stockpile by January 15, 1957

Closing prices and turnovers are given in the table overleaf.

LONDON METAL AND ORE PRICES, NOVEMBER 29, 1956

THE WEEK ON THE L.M.E.

	November 22		November 29	
	Buyers	*Sellers*	*Buyers*	*Sellers*
Copper				
Cash	£270	£270½	£275½	£276
Three months	£271½	£272	£277	£277½
Settlement	£270½		£276	
Week's turnover	5,800 tons		5,600 tons	
Lead				
Current ½ month	£117½	£117¾	£116½	£116¾
Three months	£116	£116¼	£116	£116¼
Week's turnover	3,450 tons		3,375 tons	
Tin				
Cash	£845	£847½	£846	£847
Three months	£825	£827½	£835	£836
Settlement	£847½		£847	
Week's turnover	760 tons		685 tons	
Zinc				
Current ½ month	£100	£100¼	£101½	£102
Three months	£95½	£95¾	£97¼	£97½
Week's turnover	5,350 tons		2,825 tons	

METAL PRICES

Aluminium, 99.5%, £198 10s. per ton

Antimony—
English (99%) delivered, 10 cwt. and over £210 per ton
Crude (70%) £200 per ton
Ore (60%) bases 23s. 6d./24s. 6d. nom. per unit, c.i.f.

Arsenic, £400 per ton

Bismuth (min. 1 ton lots) 16s. lb. nom.

Cadmium 12s. 0d. lb.

Cerium (99% nett), £13 18s. lb. delivered U.K.

Chromium, 7s. 1d. lb.

Cobalt, 21s. lb.

Copper, £276 per ton

ORES AND OXIDES

Bismuth .. 65% 8s. 6d. lb. c.i.f.
18/20% 1s. 3d. lb. c.i.f.

Chrome Ore—
Rhodesian Metallurgical (semifriable) 48% .. £17 8s. 0d. per ton c.i.f.
" Hard Lumpy (45%) .. £17 8s. 0d. per ton c.i.f.
" Refractory 40% .. £12 15s. 0d. per ton c.i.f.
" Smalls 42% .. £15 9s. 0d. per ton c.i.f.
Baluchistan .. £18 15s. 0d. per ton c.i.f.
Columbite, 65% combined oxides, high grade .. 190s./205s. per unit

Lithium Ore—
Petalite min. 3½% Li_2O .. £8-£10 per ton f.o.b. Beira
Lepidolite min. 3½% Li_2O .. £8-£10 per ton f.o.b. Beira
Amblygonite basis 7% Li_2O .. £35-£40 per ton f.o.b. Beira
Magnesite, ground calcined .. £28 0s./£30 0s. d/d
Magnesite Raw (ground) .. £21 0s./£22 0s. d/d
Molybdenite (85% basis) .. 8s. 5d. nom. per lb. (f.o.b.)

Titanium Ore—
Rutile 95/97% TiO_2 .. £95 per ton c.i.f. Aust'n
Ilmenite 52/54% TiO_2 .. £11 per ton c.i.f. Malayan
Wolfram and Scheelite (65%) .. 228s. 6d./234s. 0d. per unit c.i.

Manganese Ore Indian
Europe (46%-48%) basis 125s. freight .. 137d. nom. per unit c.i.f.
Manganese Ore (43%-45%) .. 115d. nom. per unit c.i.f.
Manganese Ore (38%-40%) .. 110d. nom. per unit, (including duty)

Vanadium —
Fused oxide 90-95% V_2O_5 .. £12½-£13½ per unit c.i.f.
Zircon Sand (Australian) (63-66% ZrO_2) .. £20 per ton c.i.f.
Zirconium Oxide — Calcined Opacifier .. £325 1-ton, delivered

Germanium, 99.99%, Ge.kilo lots 3s. 4d. per gram
Gold, 251s. ¼d
Iridium, £29/31 oz.
Lanthanum (98/99%) 15s. per gram
Lead, £116 15s. per ton
Manganese Metal (96% - 98%) £259/£265 according to quantity
Magnesium, 2s. 4d. lb.
Nickel, 99.5% (home trade) £519 per ton
Osmium, £24/27 oz. nom.
Osmiridium, nom.
Palladium, £8 0s./£8 10s. oz.
Platinum U.K. and Empire Refined £34/£35 oz.
Imported £37 15s. nom.
Quicksilver, £83 10s. - £84 10s., ex-warehouse
Rhodium, £42. oz.
Ruthenium, £15/£17 oz.
Selenium, 112s. nom. per lb.
Silver, 81½d. f.oz. spot and 80½d. f'd.
Tellurium, 15s./16s. lb.
Tin, £847 per ton
Zinc, £102 per ton

LONDON STOCK EXCHANGE PRICES, NOVEMBER 28, 1956

Finance	Price Nov. 28	+ or — on week
African & European	53/9	—3/1½
Anglo American Corpn.	6⅛	—¼
Anglo-French	21/3	—6d
Anglo-Transvaal Consol.	26/3	.....
Central Mining (£1 shrs.)	52/6	.....
Consolidated G'fields	58/9	—9d
Consol. Mines Selection	30/7½	—1/3
East Rand Consols	1/6	—3d
General Mining	68/9	—1/3
H. E. Prop.	7/6	—3d
Johannies	40/9	—6d
Rand Mines	65/-	.....
Rand Selection	33/1½ x D	—2/6
Union Corporation	35/6	—1/-
Vereeniging Estates	5¼	—¼
Writs	31/3	—1/3
West Wits	33/6	+6d
Rand Gold		
Blyvoors	21/6	—6d
Brakpan	6/1½	+1½d
Buffelsfontein	25/1½	—1/-
City Deep	11/-	—6d
Consol. Main Reef	15/6	—6d
Crown	30/7½	—1/3
Daggas	36/10½	+7½d
Dominion Reefs	16/6	—3d
Doornfontein	20/3	—4½d
Durban Deep	26/10½	.....
E. Champs	3/3	.....
E. Daggas	8/9	.....
E. Geduld (4s. units)	30/3	.....
E. Rand Props.	45/7½	+7½d
Geduld	75/7½	+5/7½
Govt. Areas	3/3	.....
Grootvlei	17/7½	—7½d
Hartebeestfontein	40/10½	—1/6
Libanon	6/6	—3d
Luipaards Vlei	9/9	—3d
Marievale	17/7½	—6d
New Kleinfontein	3/9	—3d
New Pioneer	13/6	—9d
Randfontein	30/6	—1/3
Robinson Deep	7/6	—3d
Rose Deep	8/6	.....
Simmer & Jack	4/-	.....
S.A. Lands	24/4½	.....
Springs	2/4½	.....
Stilfontein	25/3	—9d
Sub Nigel	21/10½	.....
Vaal Reefs	27/6	—6d
Van Dyk	2/-	—3d
Venterspost	13/6	—3d
Vlakfontein	15/7½	—3d
Vogelstruisbult	13/6	—4½d
West Driefontein	4⅛	—⅛

Rand Gold contd.	Price Nov. 28	+ or — on week
W. Rand Consolidated	28/1½	.....
Western Reefs	27/4½	+10½d
O.F.S. Gold		
Freddies	6/6	—6d
Freddies Consolidated	3/6	—3d
F.S. Geduld	72/6	—3/9
Geoffries	2/9	—6d
Harmony	23/6	—3d
Loraine	4/3	—3d
Lydenburg Estates	13/-	—6d
Merriespruit	4/9	+3d
Middle Wits	7/6	—6d
Ofsits	48/9	—2/3
President Brand	52/6	—3/9
President Steyn	31/-	—3d
St. Helena	25/6	—9d
Virginia Ord.	8/6	—4½d
Welkom	15/-	—3d
Western Holdings	68/1½	—2/6
West African Gold		
Amalgamated Banket	1/6	+2d
Ariston	3/10½	+3d
Ashanti	14/3	.....
Bibiani	1/10½	.....
Bremang	1/4½	+1½d
G.C. Main Reef	1/6	.....
Konongo	1/3	—1½d
Marlu	—½d.	—1½d
Taquah	10½d	.....
Western Selection	6/9	—3d
Australian Gold		
Gold Mines of Kalgoorlie	13/9	+1½d
Great Boulder Prop.	11/7½	.....
Lake View & Star	15/10½	—3d
Mount Morgan	17/-	—3d
North Kalgurli	6/9	+1½d
Sons of Gwalia	1/9	.....
Western Mining	10/6	.....
Miscellaneous Gold		
Cam & Motor	8/6	+3d
Champion Reef	12/9	+6d
Falcon Mines	7/9	.....
Globe & Phoenix	23/-	.....
Motapa	9d.	.....
Mysore	3/4½	+1½d
Nundydroog	17/4½	+3d
St. John d'El Rey	53/-	+4/3
Zams	45/-	.....

Diamonds and Platinum	Price Nov. 28	+ or — on week
Anglo American Inv.	8¼	.....
Casts	23/4½	—1/9
Cons. Diam. of S.W.A.	10/9	.....
De Beers Def'd. Regd.	4½	—⅛
De Beers Pfd. Regd.	13½	.....
Pots Platinum	13/4½	—3d
Waterval	24/-	+3d
Copper		
Bancroft	43/-	—2/-
Chartered	66/-	—2/6
Esperanza	2/3	.....
Messina	8¼	.....
Nchanga	12⅛	—⅛
Rhod. Anglo-American	94/4½	—6/10½
Rhod. Katanga	37/6	—4/9
Rhodesian Selection	42/6	—1/-
Rhokana	37½	—½
Rio Tinto	78/9	—2/6
Roan Antelope	24/4½	—6d
Selection Trust	4½	—⅛
Tanks	7⅛	—⅛
Tharsis Sulphur Br.	5½	—¼
Tin (Eastern)		
Ayer Hitam	22/-	+1/-
Gopeng	12/4½	—3d
Hongkong	5/7½	.....
Ipoh	25/-XD	—2/-
Kamunting	9/3	.....
Kepong Dredging	4/6XD	—3d
Kinto Tin Mines	19/3	—3d
Malayan Dredging	14/4½ x D	—1½d
Pahang	11/7½	.....
Pengkalen	16/-	—3d
Petaling	7/6	—1½d
Rambutan	26/-	.....
Siamese Tin	12/1½ x D	—6d
Southern Kinta	16/1½	—6d
S. Malaya	11/6XD	+4½d
S. Tronoh	6/6	.....
Sungei Kinta	16/3	—9d
Tekka Taiping	7/4½	.....
Tronoh	12/1½	.....
Tin (Nigerian and Miscellaneous)		
Amalgamated Tin	10/3	—4½d
Beralt Tin	47/-	—1/6
Bisichi	4/9	—1½d
British Tin Inv.	20/3	—9d
Ex-Lands Nigeria	2/1½	.....
Geevor Tin	19/1½	+6d

Tin (Nigerian and Miscellaneous) contd.	Price Nov. 28	+ or — on week
Gold & Base Metal	1/1½	.....
Jantar Nigeria	4/6	—1½d
Jos Tin Area	13/9	+3d
Kaduna Prospectors	1/6	.....
Kaduna Syndicate	2/3	.....
London Tin	9/9	—3d
United Tin	9d	—1½d
Silver, Lead, Zinc		
Broken Hill South	61/6	—1/-
Burma Mines	3/9	—1½d
Consol. Zinc	61/6	—1/3
Lake George	13/10½	—4½d
Mount Isa	24/9	.....
New Broken Hill	46/-	+1/6
North Broken Hill	102/6	—2/6
Rhodesian Broken Hill	11/3	—4½d
San Francisco Mines	27/-	—3d
Uruwira	3/9	—1½d
Miscellaneous		
Base Metals and Coal		
Amal. Collieries of S.A.	2⅛	.....
Associated Manganese	36/3	—3d
Cape Asbestos	8/7½	—9d
C.P. Manganese	22/-	—1/-
Consol. Murchison	50/7½	—1/3
Natal Navigation	63/9	.....
Turner & Newall	92/9	—2/7½
Wankie	16/3	+6d
Witbank Colliery	5⅛	.....
Canadian Mines		
Dome	$26	.....
Hollinger	$47½	—3½
Hudson Bay Mining	$168	—4
International Nickel	$187½	—9
Mining Corpn. of Canada	£8	+¼
Noranda	$104	—7
Quemont	£7¾	—¼
Yukon	4/3	—1½d
Oil		
Apex	43/-	—1/-
Attock	31/-	.....
British Petroleum	113/1½	—4/4½
Burmah	73/1½	—2/6
Canadian Eagle	64/3	—9d
Mexican Eagle	24/6	—7½d
Shell	134/-	—3/-
T.P.D.	37/9	—1/6
Ultramar	49/6	—3/6

Mining Finance

South West Africa Company Still Looks Cheap

It has been obvious for some time that the South West Africa Company would have to give its shareholders some guidance as to what action to take in the face of the steep rise in the price of its 13s. 4d. shares from 50s. to over 88s. during 1956.

In the event—much more could have been revealed—the corner of the curtain now lifted discloses that negotiations are in progress with other parties and an offer may be made for the company's shares. Accordingly, members were advised in somewhat guarded terms that, "they might possibly regret disposing of their holdings" at the middle price of 71s. 3d. on November 3 and this has since proved to have been correct. More intriguing, however, was the circular's accompanying statement that the agreement contemplated would require prior consent of H.M. Treasury.

Although the S.W. Africa Co.'s mining operations bring in a good deal of revenue, experience to date has shown that costs are evidently too high for anything but a slender margin of profit to be made at the present rate of output. Of immediate importance, therefore, is the company's holding of 95,000 Tsumeb Corporation 5s. shares. This company operates a lead, zinc, cadmium and silver mine also situated in South West Africa. Over the past few years Tsumeb's expansion has been dramatic and dividends from this source have been the prime factor enabling the South West Africa Company to make a distribution to shareholders.

The value of this important investment is shown on the company's balance sheet at the purely nominal figure of £5,938. But current profits clearly indicate that this valuation bears no relation to fact. To get some idea of Tsumeb's worth, it is necessary to look at the latest report and accounts of Selection Trust, the holder of 14.25 per cent of the equity. To evaluate its stake, Selection Trust has used the purely arbitrary calculation of nine times the Corporation's profits after tax.

During the year ended June 30, 1956, Tsumeb paid dividends totalling 35s. per share against 17s. previously and distributions looks like being increased again during the current year. On this basis the entire company can be valued at some £85,000,000 and the S.W. Africa Co.'s 95,000 shares (or 2½ per cent) at about £2,000,000. The S.W.A. Company's 531,807 shares of 13s. 4d. would appear to have a potential value of £3 10s. per share apart from a further £2 in respect of other assets. This compares with a current market price of 85s.

Although possibly a long shot, a look at the present holders of Tsumeb shares might give a pointer towards the bidder's identity. Apart from S.W. Africa Co.'s 2½ per cent, and Selection Trust's 14¼ per cent interests, the American Metal Company holds 28½ per cent, and the O'Okiep Copper Company (in which American Metal holds about 20 per cent) another 9½ per cent. Union Corporation is another shareholder, but no figures are available to show to what extent. It is thus possible to account for some 55 per cent of the shares of which American Metal directly and indirectly controls about 30 per cent. In this respect it is interesting to note that Selection Trust holds 25 per cent cent of American Metal.

Sufficient evidence it seems could be gathered to support an argument that American Metal—and its associates—might in fact be bidding for the company. If this proves to be the case, it is perhaps easier to understand why the consent of H.M. Treasury would be necessary before the purchase went through. The case of Trinidad Oil immediately springs to mind—we are certainly no better off for dollars than we were then. At the same time if the transaction is allowed, it will provide one more glaring example of the damage that high taxation and its concomitant, the attempts (sometimes abortive) by companies to escape to more equitable tax climes, have wrought.

Two further points come to mind in identifying American Metal as the bidder. In the first place, South West Africa Company has needed further working capital for some time and American Metal is well placed to supply it. Secondly, despite the S.W. Africa Co.'s application to transfer residence from the U.K. having been refused, if a foreign organization were permitted to buy the company, it would be difficult to prevent subsequent liquidation and re-registration outside the grasp of the British taxation authorities. In this connection it is useful to look at the profit and loss account for the year ended June 30, 1955, which reveals that taxation—had it not been for an unusual credit—would have absorbed some £73,000 of the net profits of £110,000. In the event of a sizable reduction in this liability, the company's very small issued capital of £354,538 could thus permit a substantial rise in earnings.

CASTS DISAPPOINT

In his statement to shareholders of Consolidated African Selection Trust, Mr. A. Chester Beatty re-affirmed his company's intention of making a fuller distribution of yearly earnings in the

RECENT INTERIM DIVIDEND ANNOUNCEMENTS

Company	Year Ending	Dividends Latest	Dividends Previous	Date Payable	Total Last Year
		%	%		%
Amal. Tin	31. 3.57	8	8	Dec. 28	45
Cam and Motor	30. 6.56	20	20	Jan. 16	40
Siamese Tin	31.12.56	25(*a*)	17½	—	45
Cons. Zinc	31.12.56	7½	7½	—	22½
N. Broken Hill	31.12.56	40	40	—	90
Taiping Cons.	31.12.56	15	15	—	30

(*a*) To date 32½% (25%).

RECENT FINAL DIVIDENDS AND PRELIMINARY FIGURES

Company	Year Ended	Final Dividend	Net Profit after tax This	Net Profit after tax Last	Total Dividends This	Total Dividends Last
		%	£(000)	£(000)	%	%
Kern Oil (*a*)	31. 5.56	25	534	484	25	25
Mount Isa (*b*)	30. 6.56	15	5,702	4,107	25	25
New Jagersftn.	31.12.56	2½	52	53	5	5
Griqualand Diamonds	31.12.56	2s. 11d.	—	—	4s. 10d.	4s. 10d.
Cons. Bultft'n.	31.12.56	7½d.	—	—	1s. 2½d.	1s. 2½d.
Malayan Tin (*d*)	30. 6.56	10	473	100	40	40
S. Malayan Tin (*d*)	30. 6.56	6¾	321	317	33½	46¾
Kepong Dredging	30. 6.56	10	17	4	15	5
Ipoh Tin	31. 3.56	12½	21	102	12½	37½
Temoh Tin	30. 6.56	15	15	10	15	12½
Rand Sel. Corp. (*e*)	30. 9.56	45	1,024	1,069	45	45
Barclays D.C.O. (*d*)	30. 9.56	4	1,261	1,152	8	8
S.A. Townships	30. 9.56	2½	75	142	2½	2½
Siberian Synd.	30. 9.56	10	4	4	10	10
Cons. Tin of Burma	31. 3.56	Nil	8	7	Nil	7½

(*a*) Dividend includes 7½% bonus.
(*b*) Australian currency.
(*c*) Profit *before* taxation.
(*d*) 1955-6 dividends on larger capital.
(*e*) Latest dividends on larger capital.

WEST AFRICAN QUARTERLIES

Company	Sept. qtr. 1956	June qtr. 1956	Dec. qtr. 1955	Sept. qtr. 1955
	£	£	£	£
Amalgamated Banket	111,144	55,498	19,492	103,303
Ariston	128,940	94,356	46,044	143,860
Bremang	56,915	34,672	20,778	53,020
G.C.M.R.	41,799	35,765	2,395	14,839

future. This decision arises mainly from the compensation monies received by Sierra Leone Selection Trust (Casts' wholly-owned subsidiary) totalling £1,570,000 from the Sierra Leone government in exchange for diamond rights previously held. While the decision is naturally favourable to the shareholder, it is impossible not to be disappointed that the expected tax-free return of capital did not, in the event, materialize. The market has expressed its feeling on this point in the price of Casts' 5s. shares which, after touching a high point of 28s. 3d. earlier in the year, have now receded to 23s. 4d. This has been unfortunate, but, at the same time, it must be pointed out that the investment, by returning nearly 21 per cent at the present price, has distinct attractions.

Casts' present liquidity is extremely satisfactory and net liquid assets at June 30 last exceeded £5,000,000. This money is not to be left standing idle, for the company has considerable plans for expansion. Amongst other things, these will involve the installation of large new plants in the Gold Coast and in Sierra Leone.

Germane to the foregoing is the news of a serious outbreak of illicit diamond digging and smuggling in Sierra Leone following the sudden influx of many thousands of African foreigners into the territory. Coming so soon after Sierra Leone Selection Trust's agreement with the government, and the subsequent issue of official licences—which, it was hoped, would check the long-established illicit mining activities—the news of a more serious outbreak than ever is particularly discouraging. Yet, there are reports that the new Governor, Mr. M. H. Dorman, by taking strong action, has already been able to evict some 25,000 of these unwanted strangers without serious trouble arising. What damage has been caused to Sierra Leone Selection Trust's properties is impossible to assess, but it is not thought to have been serious. Meanwhile, confidence is growing on the grounds that the stringent methods taken to restore order out of the recent chaos, augurs well for the future.

HESITANT STOCK MARKETS

Both in the U.S. and in London, stock markets were hesitant during the past week and prices showed no inclination to rise. *The Dow Jones Industrial Index* between November 23 and 28 fell from 472.56 to 466.10. *The Financial Times Industrial Ordinary Index*, however, was virtually unchanged.

Kaffirs were adversely affected by the recent London Stock Exchange failure. *The Financial Times Gold Share Index* declined further over the week to 72. Losses appeared all round, but by Wednesday night the selling was reported to have dried up.

Amongst diamonds, Casts were particularly weak while small losses were suffered by other issues. Platinums remained firm. Coppers generally managed to hold their prices and Rhokana actually moved up. Rho-Kats were slack and dropped to about 38s. after a recent high of 54s. 6d. S.W. Africa Co. moved up sharply to a high of 88s. 9d. on news of a possible bid but later receded to 86s. Trepca improved to 5s. on hopes of a capital repayment.

Financial News and Results

Higher Reserves at Mount Isa.—An improvement in Mount Isa's ore reserve position to 14,200,000 tons from 12,200,000 tons took place during the year ended June 30, 1956. Metal content was 6.1 per cent zinc, 8.1 per cent lead, and 6 oz. of silver per ton. Copper reserves also moved up to 7,800,000 tons from 5,100,000 tons but grade declined factionally to 3.75 per cent copper. The increase in respect of copper resulted from the exploration and development of southern extensions to the main Black Star copper lodes. Further southern extensions are indicated by diamond drilling, and very large additions to reserves are, therefore, expected as exploration proceeds.

During the past financial year Mount Isa produced 36,545 tons of lead, 3,289,645 oz. of silver, 30,684 tons of zinc, 15,648 tons of zinc concentrate, and 24,408 tons of blister copper. It is interesting to recall that in 1952-3 copper output was only 5,477 tons. The year's trading brought the company net profits, after taxation, of £4,301 931 (£3,307,250). Dividends absorbed £3,439,328 (same) and the balance carried forward moved up to £2,768,765 from £1,593,544. Mount Isa's overall asset position showed an improvement to £22,415,825 from £18,564,552. Current assets of £11,991,905 exceeded current liabilities and provision by some £6,500,000. Mr. G. R. Fisher is chairman. Meeting, Brisbane, Australia, December 4.

Harrisons and Crosfields.—Total assets of Harrisons and Crosfields at June 30, 1956, expanded to £13,183,909 from £12,158,910. Current assets, including

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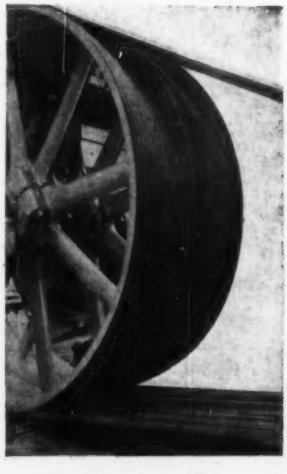

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cash of £1,339,547 (£1,383,977), moved up to £10,724,084 from £9,873,410. The company's net liquid asset position amounted to nearly £6,000,000. During the past financial year the Harrisons and Crosfield group made net profits after tax of £601,922 compared with £583,392 previously. Dividends absorbed £210,048 (£193,714), and the balance carried forward rose to £456,040 from £439,166. Sir Eric Miller is chairman. Meeting, London, December 10.

Tronoh Earns Less.—In his statement to shareholders of Tronoh Mines, Mr. J. H. Rich, the chairman, stated that returns to date indicated that results for the current year to December 31, although satisfactory, would not be quite so good as those for 1955. This was due to a lower grade being recovered by No. 1 dredge.

Outlook for Luipaards Vlei.—In his statement to shareholders of Luipaards Vlei, Mr. W. M. Barclay, the chairman, stated that notwithstanding an expected decrease in profits from the Main Reef section, the indications were that total working profits for the year to June 30 next should exceed those of 1955-56.

S.A. Uranium Exports.—Exports of prescribed materials for August (uranium and thorium) from South Africa under the Atomic Energy Act, have been preliminary estimated by the Department of Excise and Customs at £3,278,465. The total for the first eight months of the current year is £25,074,094.

MALAYA. Mining Engineers required for group of Tin Mining Companies. Only trained personnel considered. Commencing salary according to training and experience. Provident Fund and non-contributory pension scheme. Three-year contracts with six months' home leave on full pay. Excellent prospects for suitable men. Write, giving full particulars of age, education, training and experience and marital status, to Box 24, Walter Skinner, Ltd., 20 Copthall Avenue, London, E.C.2.

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MR. A. E. PARKINSON'S STATEMENT

The nineteenth annual ordinary general meeting of Sir Lindsay Parkinson & Co., Ltd., was held on November 28 at the Piccadilly Hotel, London, W., **Mr. A. E. Parkinson,** the chairman, presiding.

The following is an extract from his circulated statement:—

The accounts for the year 1955 show that the group profit applicable to the members of the parent company, after taxation, amounts to £93,580, as compared with £74,918 for 1954. The profit for 1954, however, included a credit for £113,963 in respect of provisions for taxation for earlier years no longer required.

The group profit and loss balance carried forward amounts to £172,406, compared with £103,921 brought in. After providing for the dividends for the year, the balance carried forward on the parent company's profit and loss account amounts to £122,263, compared with £64,051 brought in.

Progress at Home

Work at home has again progressed satisfactorily and during 1955 the speculative housing programme was again expanded.

Our success in securing a wide variety of building and civil engineering contracts is continuing and our operations on the production of opencast coal for the National Coal Board are also expanding.

Overseas Activities

Our subsidiary companies in Australia made a somewhat better showing in 1955 than they did in 1954. Nevertheless this field of activity is receiving close attention on the part of the board particularly having regard to the many difficulties of this market.

As forecast in my statement last year a substantial further provision has been necessary in 1955 in respect of losses suffered in Canada. Problems have, however, now been largely dealt with and while some provision will probably be necessary in 1956 we consider that the main difficulties have now been overcome.

Volume of work in Cyprus has been maintained and we are continuing to show excellent progress despite the difficulties arising from disturbed conditions.

Work under the Tema Harbour contract valued at some eight million pounds is still in progress. It will be recollected that this work is being carried out by Parkinson Howard Ltd., an association of Messrs. John Howard & Co. Ltd. and ourselves. There is still a further three years' work in prospect in this area.

Satisfactory progress is being shown in the British Guiana contract which is due for completion in 1958.

Dividend Maintained

The Board has decided again to recommend a final dividend on the Ordinary Stock at the rate of 6¼ per cent. (less tax) making a total for the year of 9 per cent (less tax). This is at the same rate as was paid for 1954.

1955 was a year in which many difficulties were surmounted, especially difficulties arising out of activities in Canada. 1956 up to date has also not been without its problems, but your Board is hopeful that when the figures for that year become available results will show a continued improvement.

The report and accounts were adopted.

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BURMA—Required immediately, two experienced Mine Surveyors holding Home Office Certificate, for service with the Burmese Government. Please apply (with full personal particulars) for terms to: The Secretary, Powell Duffryn Technical Services Ltd., 19 Berkeley Street, London, W.1, marking envelope BURMA/MS.

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ORE EXTRACTION

Quarter ended 30th September, 1955	29,394 tons
Quarter ended 31st December, 1955	28,359 ,,
Quarter ended 31st March, 1956	26,095 ,,
Quarter ended 30th June, 1956	27,350 ,,
	111,198 tons

PRODUCTION

Quarter Ended	*Concentrating Ore Milled (dry tons)*	*Oz. Silver*	ASSAYS *% Lead*	*% Zinc*
30 September, 1955	29,151	14.87	17.79	11.88
31 December, 1955	30,190	14.12	17.50	10.92
31 March, 1956	26,067	13.18	16.76	10.65
30 June, 1956	25,762	14.15	16.76	11.16

Marketable products were as follows :—

Quarter Ended	*Refined Lead Tons*	*Refined Antimonial Lead Tons*	*Refined and Doré Silver Fine Oz.*	*Copper Matte Tons*	*Nickel Speiss Tons*	*Zinc Concentrates 56%-58% Zn. Dry Tons*
30 September, 1955	3,942	85	348,236	66	14	4,035
31 December, 1955	4,189	151	389,909	143	110	3,708
31 March, 1956	3,812	166	347,528	91	203	2,949
30 June, 1956	2,942	128	272,840	79	165	3,261
	14,885	530	1,358,513	379	492	13,953

ESTIMATED REVENUE AND EXPENDITURE

	For Quarter ended June 30, 1956		*For the twelve months ended June 30, 1956*	
Estimated Gross Revenue (after adjustment of value of Metal Stocks)	K.94,08,100	£705,607	K.3,96,98,400	£2,977,380
Estimated Operating Expenditure	K.52,76,400	£395,730	K.2,34,43,000	£1,758,225
Estimated Operating Profit	K.41,31,700	£309.877	K.1,62,55,400	£1,219,155
Estimated Taxation	K.20,51,000	£153,825	K. 85,60,000	£ 642,000
Estimated Depreciation on Machinery and Plant, etc.	K. 2,18,400	£ 16,380	K. 7,81,600	£ 58,620
Capital Expenditure	K. 3,63,400	£ 27,255	K. 12,12,000	£ 90,900

After deducting the foregoing estimates for Taxation and Depreciation the estimated Net Profit for the year is K.69,13,800 (£518,535) which compares with a Net Profit of K.43,13,844 (£323, 538).

Sales of pre-war stocks of Zinc Concentrates have again made a substantial contribution to the financial results.

The Sterling figures shown are based on a Rate of Exchange of 1s. 6d. per Kyat.

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